

The Iron Age

A Review of the Hardware and Metal Trades.

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Plate Shearing Machine.

In our issue of August 10th, we had a short notice of Messrs. William Sellers & Co.'s plate shearing machine. This week we have the pleasure of presenting our readers with a cut of the machine. This will cut 1 inch plate any length, and 60 inches wide; it can also be used for trimming the edges of long plates. The sliding head, carrying the working shear blade, is of immense size and strength, as is also the housing which supports it. Back of the head, to the full width of the latter, is an unobstructed space, which allows of the unimpeded manipulation of plates not exceeding that width, without regard to length. The motion is derived from a system of mechanism which is a decided novelty in its application to machines of this class, and is capable of supplying without difficulty the enormous power required in performing the work for which it is designed. The toggle joint, one of the most powerful of all mechanical contrivances, is used in combination with a worm segment of 72 inches radius and 2½ inches pitch, placed at the inside of the right-hand upright of the housing. Upon a heavy wrought iron shaft, supported by the necessary bearings on top of the housing and traversing the whole width of the upper link or joint of the toggle, is supported the hub of the segment, which by its vibration imparts to the toggle, the upper link of which is a continuation of the former, the required motion. As the latter is connected with the top of the head, a perfectly parallel motion is insured, while from its being of the full width of the head the tremendous crushing strain to which it is subjected is distributed over so large a surface as to prevent any danger of breakage. The machine is driven by open and crossed belts 3 inches wide, running upon tight and loose pulleys of 36 inches diameter, upon the shaft of which is a pinion having 12 teeth, which drives a large gear having 96 teeth keyed to the worm shaft. A reverse motion, similar to that used by the firm on their planing machines, shifts the belts at the proper point. The return stroke is about double the speed of the cut, the difference being made by means of a larger driving pulley on the counter. By means of an automatic stop motion the head is always stopped at the end of the return stroke, to allow of accurate adjustment of the plate. When desired, however, the head may be run continuously. The stroke is variable up to 12 inches. The weight of the machine complete is 38,550 lbs. (over 19 tons). Messrs. William Sellers & Co., 1600 Hamilton street, Philadelphia, Pa., are the manufacturers.

Iron Ore at the Centennial.

In 1610, three years only after the settlement of Jamestown, Va., Sir Thomas Gates, one of the members of the London Company, testified that in Virginia there were various minerals, especially "iron ore," which had been tested in England and found to produce as good iron as any in the world. This "ore" is described as being "brown in color," brown hematite, and in the year 1620 "proof" was made of it at the iron works on Falling Creek, a branch of the James River, near Jamestown.

This is not, however, the first mention of the existence of iron ore within the limits of the present territory of the United States, though the locality has become famous from the attempt made to establish iron works at this point, and from the fate which befell it and its promoters. The first discovery was by Sir Walter Raleigh in 1585, in the present State of North Carolina. No attempt was made to utilize this ore at that time, nor were any efforts made to develop the iron resources of this State until the last century.

To realize in some slight degree how extensive and successful has been the search for iron ore, it is only necessary to pass through the buildings of the International Exhibition, especially the Main Building and the Mineral Annex, and several of the State buildings. Nearly every State in the Union is represented, and nearly if not quite every known variety of iron ore is on exhibition. The ores of Sweden are almost exactly reproduced in analysis by the ores of Lake Champlain and by those of central North Carolina. The black band ores of Scotland find their counterpart in those of Ohio. The titaniferous ores of Norway are equalled by those of northern New York and Virginia; Alabama, Georgia, Tennessee, Virginia and Missouri furnish an abundance of manganese ores for the manufacture of spiegeleisen, while the whole Lake Superior region as well as the Iron Mountain region of Missouri, and the Lynchburg region of Virginia furnish deposits of magnetic specular and hematite ores that for purity and extent are unequalled in the world.

It is, of course, impossible for us to mention every specimen shown, or even every locality represented. In the New Jersey exhibit, for example, there are 184 specimens of magnetic ore on exhibition. The best we can hope to do

is to mention the most notable exhibits and localities, and in the case of several collective displays of ores and iron and their products to enter more into detail.

THE IRON ORES FROM NEW ENGLAND.

Though previous to the Revolution the bulk of the iron made in the country was produced in New England, its glory in this respect has long since departed, and with the exception of the Stockbridge district, in Massachusetts, and the Salisbury district, in Connecticut, the amount of iron produced in this section is inconsiderable, the production of pig iron for 1875 in all the rest of New England being but 4446 tons, all charcoal.

From Maine the only ores exhibited are some limonites containing ferric oxide, 76-87; water and organic matter, 19-25; silica, 0-71; sulphuric acid, 3-10; phosphoric acid, 0-10, and bog ores used at the Katahdin Furnace, which has the honor of being the first, last and only furnace in Maine.

From New Hampshire, Vermont and Rhode Island no ores are shown, unless there may be some cabinet specimens that are swallowed out of sight by their surroundings. This is not from any lack of very excellent ores in these States, for they are abundant, but charcoal has become so scarce and anthracite so dear that the furnaces have been abandoned, except two in Vermont, and, of course, the incentive to exhibition is gone.

magnetic and specular ores of the Lake Champlain region, are, economically, among the most important in the country. It is from these ores that nearly, if not quite all, the American billets used in the manufacture of high grade steel are produced. They are used largely as mixtures in furnaces, and furnish nearly all the fix or fettling for the boiling furnaces of the rolling mills east of the Alleghenies. The amount shipped from this region yearly is between 300,000 and 400,000 tons. The prominent exhibits of ore from the Lake Champlain region are: The Port Henry Iron Ore Company, Witherbee, Sherman & Co., Hussey & Howe Mining Company, Peru Steel and Iron Company and J. & J. Rogers Iron Co., the two latter showing Palmer ore. The Lackawanna Iron and Coal Company, of Scranton, also exhibit Crown Point ore; and the Albany & Rensselaer Iron and Steel Company, New Bed. Ores are also shown from St. Lawrence.

The ores of the Lake Champlain region, though magnetics so far as we have to deal with them, seem to divide themselves into three distinct classes, which differ not only in their physical characteristics but in their chemical as well, and consequently in their action in the blast and puddling furnace. These three kinds may exist in the same vein or bed. The first seems to be an aggregation of large pea-shaped grains, with lustrous cleavage faces or crystalline facets, easily disintegrates, and is apparently a clear

Henry Iron Company is found about six miles from Port Henry, on a hillside, about 1000 feet above the Lake. The bed is 60 feet thick and was worked in an excavation 100 feet by 300 and 100 feet deep. At this point there is situated a cluster of pits and shafts which open into several different ore beds; but occupying the corners of several lots, these openings are included within an area of only four or five acres. The ore cannot be divided by visible lines, but exists beneath the surface in uniform and unbroken masses, instead of being merely an enormous pocket which might readily be exhausted, as originally conjectured. As descent is made evidences accumulate of the presence of an inexhaustible deposit. In 1824 two individual one-fourths of this property were sold by Mr. E. D. Sanford for \$300. It is a curious fact that works were once built at this point for extracting the phosphate of lime from this ore for a fertilizer. This deposit shows in analysis 67-51 per cent. metallic iron and 0-22 phosphorus.

The New Bed ore is located at Moriah, near the Barton and Fisher. As is well known, most of the Champlain ores carry too much phosphates of lime to allow of their being used in the manufacture of Bessemer pig. One of these exceptions is the Crown Point ore mentioned below and others the three mentioned above, but it is only the purer and best from either that will answer the purpose. The analy-

solved to cut through this dyke, 14 feet, and on doing so broke into the solid ore. The J. & J. Rogers Iron Company, in a placard over their exhibit of iron, state that it is "made entirely of Palmer ore, which is similar to Dannemora." We have no analysis of the ore, but the billet shows the following:

Silicon.....	0-021
Carbon.....	0-230
Phosphorus.....	0-034
Sulphur.....	trace.
Iron.....	99-550
Slag.....	150
	100-000

The Hussey & Howe mine, formerly known as the Arnold ore bed, is another of the very rich and pure ores suitable for billets and iron requiring great toughness. There are four veins. The Old Blue, so called, yields from 2 to 8 feet of a remarkably pure magnetic oxide, with a little silica; all four veins lie parallel, dipping toward the west. They are separated from each other by a few feet of rock, the black bed being from 3 to 11 feet and the gray beds from 2 to 8 feet wide. These ores are remarkably free from phosphorus and sulphur. Prof. Otto Wuth, of Pittsburgh, gives an analysis and reports as follows on the Black Vein

Silicic acid.....	3-35
Peroxide of iron.....	92-67
Protoxide of iron.....	3-36
Lime.....	0-23
Magnesia.....	0-23
Phosphoric acid.....	0-014
Titanic acid.....	trace
	100-000

"It is entirely free from sulphur. The amount of phosphorus is so small that four times the percentage would not have the least influence on the quality of either iron or steel. I do not believe that a purer ore is found either in the United States or in Europe. In all my experience I have never met an ore as free from both sulphur and phosphorus."

There are four principal deposits, or veins, from which these ores are now obtained. They lie in close proximity to each other, and are worked from the same shafts and openings, and are all similar in character, being remarkably free from substances injurious to iron, and unusually rich in the percentage of product, and are superior to use in connection with such other ores as contain injurious amounts of sulphur or phosphorus.

The proprietor says of these ores: "The analyses show the ore to be exceedingly well adapted for use in forges in making blooms directly from the ore, and the iron thus made is, and has been, extensively used, and is well known to be very superior for making wire, machine horse nails, boiler plates, and all purposes where great toughness and strength are required."

(To be continued.)

Plating with German Silver.—Many

unsuccessful attempts have been made to nickel small articles by boiling, just as pins, hooks and eyes, &c., are silvered or tinned. A Nuremberg chemist, named Dr. Kayser, has succeeded in coating metals with an alloy resembling German silver, thus giving them a handsome finish, and making the surface more durable and permanent than that of tin or silver. He first melts together one part copper and five parts pure tin—preferably the Australian, which has recently come into commerce, almost absolutely pure, yet cheaper than Banca tin. The alloy is granulated as usual, but not too fine, and then mixed with water and tartar as free from lime as possible, into a paste. To each 300 parts of the granulated alloy is added one part ignited oxide of nickel, and the articles are laid in it. After boiling a short time they become beautifully silvered. Some fresh oxide of nickel must, of course, be added from time to time. Brass and copper articles can be easily silvered in this manner without previous preparation; those of iron must first be copper-plated. By adding some carbonate of nickel to the above bath, or to a common white bath, and boiling, a coating richer in nickel is obtained, and darker, varying in color from that of platinum to a blue black, according to the amount of nickel salt added.

Untrustworthy Lightning Conductors.—An inquiry into the condition of

the lightning rods of Paris and the department of the Seine has been conducted by M. R. F. Michel, who finds that 40 per cent. of the platinum tips are adulterated with from 6 to 17 per cent. of lead. Points, even of very small dimensions, say 45 millimeters long with a basal diameter of 3-65 millimeters, were hollowed out for 30 millimeters, so as to make a cylinder which was only 0-75 millimeter thick. This was filled up with an alloy of tin and lead. Cut across and laid in a crucible heated to redness the alloy melted out, and, in some cases, could be removed as a loose core. The proportion of twisted, scorched, or dislodged points to sound ones was 88 per cent. It is impossible to test the points as they are delivered fixed to the rods. M. Michel also finds fault with the use of wire cable, copper or iron. The passage of electricity and the influence of damp air, wind and rain predispose to breakage. He prefers the use of a copper rod.

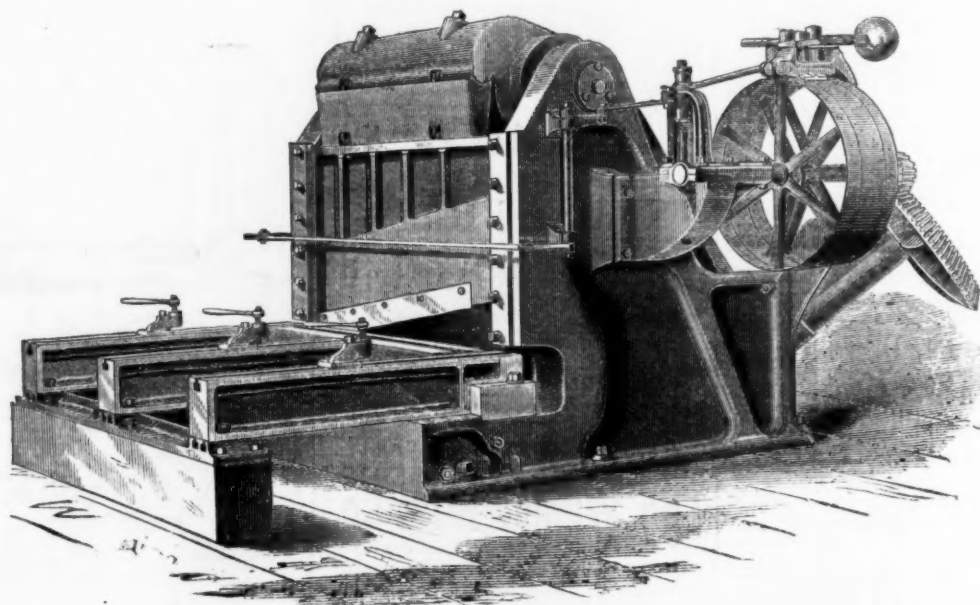


PLATE SHEARING MACHINE.

Massachusetts is represented by ores from West Stockbridge and Richmond, exhibited by the Stockbridge Iron Company. These ores are the same as those found in Vermont on the one side and Connecticut on the other, and extend in a westerly direction into New York. The ores are brown hematites, deposited in clay and gravel banks, in the lower Silurian, in lines parallel with the Green Mountains. Some of these deposits have been worked since before the Revolutionary War, and have yielded upward of 100,000 tons of ore, without showing any signs of exhaustion.

The ores of Connecticut, which are closely related to those just mentioned, are among the most interesting in the country. The iron produced from the famous beds of brown hematite at Salisbury had a reputation long before the Revolution, and notwithstanding the vast discoveries made since, they have retained their reputation in latter years as making a car wheel iron of most excellent quality. Some beautiful specimens of ore from the Old Hill Mine are shown in the display of Barnum, Richardson & Co., at E. 71 and 72, in Machinery Hall. This is one of the neatest and prettiest displays of iron ore in the Exposition. The samples shown are in the form of geodes and nodules, and pipe ore, and yield 40 to 50 per cent. of metallic iron in the furnace. The Salisbury Ore Hill, which still supplies the furnaces of Barnum, Richardson & Co., is an open quarry 20 or 25 feet deep, extending over some acres, and at one time for 40 consecutive years yielded 5000 tons per annum. Old Hill Mine, which is also a huge open quarry, with a high bridge over it, across which passes the main road, furnished ore which was worked in bloomeries 136 or 137 years ago, and also supplied the old Lakeville Furnace, which cast shot, shell and cannon for the Continentals, not for the British, as is generally stated. The catalogue of the Exposition mentions a display of ores from Lakeville, exhibited by Blanchard & Lippitt, but we failed to find it. We also failed to find any exhibits of the spathic ores of this State, which are of considerable interest, both historically and economically.

THE IRON ORE FROM NEW YORK.

The iron ores of New York, especially the

magnetite. From the same mine may be thrown up masses with a different grain largely and intimately intermixed with transparent, slightly colored and smaller grains of silice, very uniformly disseminated, and others still carry a large amount of phosphate of lime. Some of the ores of this region are highly titaniferous, and still others instead of being pure magnetites are peroxidized or martites.

The Port Henry ore is one of the most extensive deposits in this region. This ore exists as a "vein" under the clay from 150 to 200 feet in width. Mr. Bell describes this deposit as "a huge prism of ore of about 200 feet square, descending, no one knows how far, at an angle of from 36° to 40°." There are said to be four known veins in the neighborhood of Port Henry, varying from 12 to 15 feet in diameter. The two Cheever veins, two miles north of Port Henry and a quarter of a mile back from the shore of Lake Champlain, yield a fine grained magnetic oxide, showing in analysis 66-97 per cent. of metallic iron, with 0-109 of phosphorus and about the same of sulphur and a little over 4 per cent. of silicic acid and silicates. A knowledge of the existence of ore in this locality appears to have been almost contemporaneous with the settlement, as it cropped out so prominently on the surface as to attract the attention of any casual observer. Ore is known to have been procured from the bed as early as the year 1804, but the subject excited slight interest, and no appreciation existed of the great magnitude and value of the deposit. It was moderately worked from 1830 to 1833, at which time it was sold for \$5000 to Horace Grey, of Boston. Since the occupation by the present proprietors the mine has been worked without intermission, and yields annually 50,000 to 65,000 tons of ore. Of this, from one-fourth to one-third is used by the Bay State Iron Company in their two large blast furnaces at Port Henry. It is found in a regular bed between a floor and ceiling from 5 to 15 feet apart. The deposit is reached by perpendicular shafts 315 feet deep, from the bottom of which the floor rises at an angle of 15 degrees to a ridge, and then pitches the other way at a similar angle.

The famous Old Bed ore property of the Port

sis of New Bed pure ore, as made by J. B. Britton, is as follows:

Iron.....	68-24
Oxygen with iron.....	26-01
Water.....	3-38
Insoluble matter.....	4-32
Sulphur.....	0-008
Phosphorus.....	0-008
Alumina.....	0-28
Lime.....	0-14
Undetermined and loss.....	0-592
	100-000

An iron made exclusively of this ore showed but 0-048 of phosphorus and 1-019 of silicon, and from New Bed about 12½ per cent. of cinder; phosphorus, 0-008, and silicon, 1-689.

The Crown Point ore, specimens of which are shown by the Lackawanna Iron and Coal Company, of Scranton, is the property of the Messrs. Hammond, and, as is mentioned above, is one of the ores that can be used in the manufacture of Bessemer pig. The ore is a black magnetic oxide, friable, and makes a very tough iron. It is used by the above named firm as a furnace mixture, and the analysis given is as follows:

Silica.....	23-93
Oxide of iron.....	73-51
Alumina.....	1-50
Lime.....	0-60
Magnesia.....	0-20
Phosphoric acid.....	0-04
Oxide of manganese.....	0-23
	100-000

Metallic iron..... 83-21
The Palmer ore beds are among the most notable in this region, and appear in no less than four exhibits. It is this ore from which the Rogers and Penn billets, so largely used in the manufacture of best cast steel, are made. It is a black magnetic ore, resembling the Hussey and Howe ore mentioned below, but runs more in the crystalline rocks, with large masses of feldspar and quartz and a little mica disseminated. Dr. Emmons calls this deposit a bunch of magnetic ore 35 feet wide, without distinct walls, gradually passing into altered sandstone at the edges, and much mixed up with sand, requiring washing. The ore is shown in the display of the Penn Iron and Steel Company, both washed and unwashed. The history of the working is curious. For a long time a great dyke hid the main deposit from a lean ore, which was worked. When on the point of abandoning the workings it was re-

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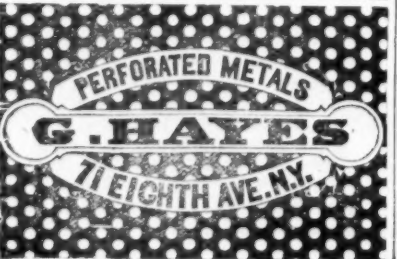
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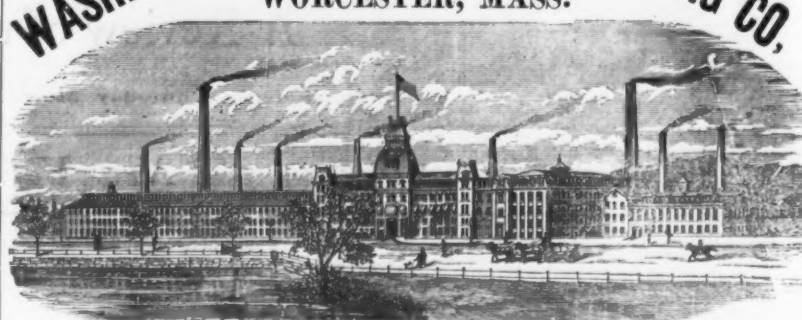
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and Chain Wire. Wire for the manufacture of Card Clothing, Heddles, Reeds &c. Piano-string Covering Wire,
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Spiral Spring Wire, and Bedded Wire to Pattern for particular purposes, from selected stamps of Norway Iron.
Any grade of Wire furnished, Annealed, Bright, Polished, Coppered, Galvanized or Tin Plated. Wire furnished,
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BRASS, COPPER AND IRON**WIRE CLOTH,****Ship and Railroad Lanterns,****Signal Lights, Conductors' Lanterns,****ADJUSTABLE GLOBE HAND LANTERN,****DESK AND OFFICE RAILING****RIDDLES, Coal and Sand Screens,****RUBBER FEEDERS & SPARK GUARDS****Ornamental Wire Fence.****Geo. W. Prentiss & Co.,**

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Of all sizes straightened and cut to order.

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Tinned Wire, Tinned, Broom, Spring Wire, made
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Wire straightened and cut to lengths. Represented
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Special facilities for manufacturing small articles of
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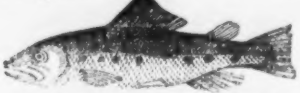
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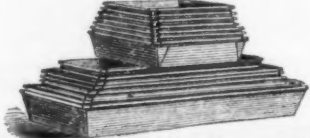
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All warranted the Best Solid Cast Steel.

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Manila Pails

REDUCED TO \$7.50 PER DOZ.

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Are Durable, Light, Strong
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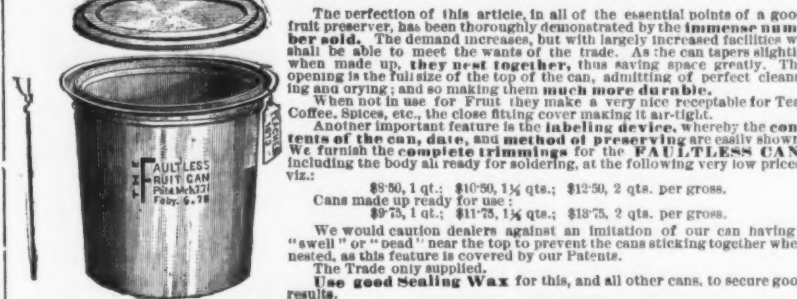
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Also Patent Tempered Steel Furniture Springs, constantly on hand.
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The Faultless Fruit Can.

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F. STURGES & CO., Sole Manufacturers,
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Cherry Heat Welding Compound.

OFFICE, 24 Exchange Place, Jersey City, N. J.

This compound is put up and warranted genuine only in 1, 5, 10, 50 and 100 lb.

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General Agents at manufacturers' prices, in large or small quantities:

WHITMORE, WOLFF, LANE & CO., Pittsburgh, Pa.

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Machinists' Tools at the Centennial.

In looking back upon the crude and incon-
venient devices embodied in the machinists'
tools of a quarter of a century ago, and com-
paring them with those of the present day, it
is impossible for even the greatest advocate of
old time institutions to repress a feeling of ad-
miration for the ingenuity and mechanical skill
necessarily expended in attaining the wonder-
ful degree of accuracy and perfection which
characterize this, as having made progress in
advance of almost all other classes of machin-
ery.

The improvement is the more particularly
noticeable from its rapidity in the tools man-
ufactured in our Eastern States, as but a very
few years ago to call a lathe or planer a "Yankee
tool" was considered about equivalent to say-
ing it was a very "poor tool," and was invari-
ably used as a term of disparagement. This,
however, was not in consequence of any lack
of ingenuity or mechanical skill on the part of
the manufacturers, as the so-called "Yankees"
are pre-eminently noted for inventive talent,
but from a desire to produce machines as
cheaply, in points of material and workman-
ship, as was consistent with their efficiency,
which from being carried to extremes, gave
them, not without reason, their unenviable rep-
utation.

The necessity for improvement, however,
once made apparent, was promptly recognized,
and to-day many of the Eastern shops are turn-
ing out tools which may justly be classed
among the best. We not unfrequently hear it
asserted that there is in America no native
skilled labor, and that we are behind the times
in mechanics. While making all due allowance
for the ignorance of the subject displayed by
the parties (in all cases American citizens) who
perpetrate such gross though unintentional
misrepresentations, it is nevertheless to be re-
gretted that such expressions of opinion are
made without due consideration of facts.

The number of exhibits of machinists' tools
at the Centennial is very large, and from the
great variety of machinery included in this
class, the display is one of the most interesting,
particularly to the initiated, to be found in the
building. In the following description of the
exhibits of the various firms all discriminative
individual comparisons will be strictly avoided,
the order of mention being without regard to
relative merit:

THE PUTNAM MACHINE CO.,

of Fitchburg, Mass., exhibit a number of tools
embodying the latest improvements for ac-
curacy and convenience. The material in the
various parts is so distributed as to give the
greatest strength and rigidity possible for the
quantity used. The planing machine has a ca-
pacity for work 30 inches wide by 30 inches
high, and is of unusual strength and power,
being capable of doing the heaviest work with-
out straining or injuring any of the parts. The
table or platen is very thick, and allowing for
the occasional truing up required on all ma-
chines of the kind will last fully as long as the
other working parts. A very noticeable fea-
ture, which would at once attract the attention
of a practical mechanic, is the perfect surfaces
of the V bearings of the bed and table. From
the fact that they are neither scraped nor ground
together (which are the usual methods), but are
just as they were taken from the planer, it is
clear that the machines used in the shops of
this company, as well as those built by them,
are of the most accurate kind. The shifter
dogs for varying the stroke of table are held by
hand screws, which, by dispensing with the use
of a wrench, render adjustment while the ma-
chine is in motion both easy and rapid. By
the interposition of a substantial spring be-
tween the lever and rod of the shifter all lost
motion is prevented, and the action rendered
prompt and reliable, thus preventing the trou-
blesome feature of variation in the point of re-
versing for which the machine is set. The ver-
tical, angular and cross feeds are automatic or
hand, at will, the former being driven by fric-
tion disks attached to the shaft of the driving
gear. The outer of these disks contains a dia-
metrical slot, in which is an adjustable lug
connected by a rod to a vertical sliding rack,
which gears into a pinion working loosely on
the transverse screw shaft, and carrying a pawl
which gives motion to the ratchet wheel in the
ordinary manner. The variations of the feeds
are effected by moving the lug from or toward
the center of the disk, thereby lengthening or
shortening the stroke of the rack, while the di-
rection is changed by passing the center. Ow-
ing to the ample stroke of the rack the quick
feed, so desirable for a finishing cut, is ob-
tained, the maximum on this machine being
about one-quarter inch. In addition to the or-
dinary feeds there is one attached to the cross-
head, which, however, is only for use in excep-
tional cases. The cross-head is gibbed to the
uprights to prevent lost motion in any direc-
tion, and allow of its being raised or lowered,
which is done by power, without the necessity
for loosening of bolts. The raising screws are
supported on hardened steel step bearings, ad-
justable by means of set screws. The rack and
all gears are cut, and work smoothly and with-
out noise. Probably the most important im-
provement contained in any of these ma-
chines is an attachment to the slotter, which,
by a very simple device, relieves the tool from
contact on the up stroke, thereby removing the
one objectionable feature of the operation. It
may be instantly varied to suit inside or out-
side, or right or left cut, and if desired with-
drawn entirely, without stopping the machine
or using a wrench. The slotter exhibited has
a stroke of 11 inches, and a revolving table of
26 inches. The frame or housing is very strong,
having a cored section, arched at the back, and,
in addition, stout internal ribs. The head is
counterbalanced by the attachment of a weight-
ed lever, and is easily adjusted, both for
position and stroke, both operations being ef-
fected by screws. A quick return motion is
gained by the use of elliptical eccentric gears,
a contrivance so perfect in its action that it is
singular (as it is very generally known) it is not
universally adopted. An analysis of the motion
shows that when the head is on the downward
or cutting stroke the shortest radius of the
driving gear is in contact with the longest of
the driven, thus in effect making a small pinion,
driving a comparatively large gear, and greatly
increasing the power while diminishing the
speed. As on the up-stroke the only work to
be performed is raising the head, which, be-
ing counterbalanced, does not require any
power, it is obvious that, by reversing

the previous order of the gears, and
gaining the necessary speed at the sacrifice
of the useless power, the object is accomplished
in the most admirable and economical manner.
The longitudinal, transverse and circular feeds
are all automatic and have ample changes of
speed, while the hand cranks, pawls, &c., are
within convenient reach from the same posi-
tion. The machine may be instantly stopped at
any point of the stroke by means of a brake
wheel on the counter shaft, a great convenience
in setting the work or tool, beside effecting a
considerable saving of time. An improved bolt
cutter, having capacity for sizes from 1/4 in. to
1 1/2 in. diameter, occupies a conspicuous posi-
tion in the space. By means of a hand lever
placed in a convenient position, the dies may
be quickly opened and the bolt withdrawn
without stopping or reversing the machine.
By the same arrangement, when tapping nuts,
the tap may be released and the nuts dropped
off the shank when the latter becomes filled,
and the tap again returned to its place without
stopping the machine. For changing the dies,
which are in four opposite sections, it is only
necessary to take off the front disc of the head
(which is done by making one-eighth revolution
of the latter) when the dies may be lifted from
their seats and others substituted in about the
length of time required to tell it. By the use
of an index gauge the dies may be made to cut
any size for which the pitch of the thread is
suitable. When the dies become dulled by use
they can be sharpened by grinding the cutting
edge on an ordinary shop grindstone, without
the necessity of drawing the temper or recut-
ting. Of course it is understood that the screws
are cut at one operation, as any machine that
requires to go over a thread more than once is
now considered an antiquated affair. The neces-
sary oil pump—without which no bolt cutter
is considered complete—receives motion from
the cam-lugs on the face of the revolving head,
which, by pressing down a horizontal lever at-
tached to the plunger, gives it the fore and
stroke, while the up stroke or suction is caused
by a spring. When it is desired to stop the op-
eration of the pump it is only necessary to de-
press the lever by means of a thumb screw, so
as to clear the lugs when the motion ceases.
As the frame or housing of the machine is made
with the cored section, the interior space is uti-
lized as a closet, having an iron door and neat
lock and key. In this are kept all sliding
shelves or trays, all the taps, dies, hubs, &c.,
which belong to the machine, and include a full
set of each, varying by eighths from 1/8 to 1 1/2
in., the pitch for each size being of the accepted
standard. The vertical car wheel boring ma-
chine has a capacity for sizes of wheels, varying
from 15 inches to 48 inches. The work is held
by a four jawed chuck of a very powerful pat-
tern, the jaws of which, while having independ-
ent adjustments to an accurately graduated
scale on the slide, are set up or tightened on
work by means of a short wrench, which gives
them a simultaneous or "universal" motion.
The bearing upon which the chuck revolves is of
the form of a double parabola in appearance hav-
ing the concave face as the journal, while the seat
or lower bearing is lined with Babbitt metal.
This style of bearing (known as Schiele's curve
of equal tangents) is claimed to be self-center-
ing and uniform in wear upon all parts of
the surface. It is undoubtedly an excellent
bearing, as the pressure is distributed over a
very large area, which, if kept properly lubri-
cated, prevents contact between the two metals,
by the interposition of a film of oil, thus reduc-
ing the running friction to a very small amount,
and preventing wear. Another advantage is,
that while having great rigidity, and not the
slightest liability to "chatter" (the word is
used entirely in a technical sense), the necessity
for a step bearing is obviated, and a large cen-
tral opening afforded for the passage of chips,
which can be conveniently removed from be-
neath the machine. The spindle is very large,
and is raised or lowered by a rack and pinion on
the back, which gives a very quick motion. The
feed has four changes—two by belt and two by
gears, the latter of which may be changed
by means of stop rod while the ma-
chine is in operation. The cutter mandrel is
of steel 3 1/2 inches diameter, and has a taper
bearing in the spindle about 13 inches long.
An independent head for squaring off hubs is
attached to the spindle. A powerfully geared
swing crane for handling the wheels is at-
tached to the side of the machine. By an ar-
rangement of the counter each change of the
cone for driving the machine admits of two
speeds, making six changes. The axle lathe is
of sufficient capacity for turning locomotive
axles, and is a convenient and substantial ma-
chine. The bed is very heavy, having flat
shears and a central feed screw which is well
protected from chips. The head and dead
spindles are of steel, and of large diameters,
the former receiving the thrust upon a loose
anti-friction collar, and having a self-centering
bearing, which allows of closing to compen-
sate for wear. The dead spindle is carried by
an adjustable poppet head for turning either
straight or taper, and having a self-centering
bearing. The feed admits of two changes for
roughing and finishing, which may be altered
by means of a handle at front of the lathe. By
means of two sizes of driving pulleys on the
counter the speed may be changed without shift-
ing the belt on the cones. A swing crane stepped
at the end of the bed enables the operator to
place on the centers the heaviest axle without
assistance. The drill press exhibited is of the
column goose neck pattern, and extra heavy.
The circular table, 25 inches diameter, is ad-
justable horizontally upon its axis and upon
that of the column, and vertically upon the
latter by means of rack and pinion. The ma-
chine is driven by a four step cone, and, being
back geared, admits of eight changes of speed.
There are four changes of automatic feed
(two belt and two gear), beside a hand feed,
either wheel or lever, and a quick return. The
bevel gears for driving the spindle are inclosed,
and by means of a convenient adjustment all
vertical lost motion of the latter may be taken
up. As the counter shaft is attached to the
machine the latter may be driven directly from
the line. The engine lathes exhibited are of
three sizes, viz., 16, 30 and 42 inches swing
respectively. Each is furnished with auto-
matic cross-feed and screw cutting attach-
ment, and the latter two with compound
rest. In common with the tools already
described, the lathes give evidence of the
greatest care and judgment employed in their
construction, and embody some very con-
venient improvements. The beautiful finish on
all machines included in this exhibit attracts
much attention and some strictures upon the
grounds of appropriateness and utility. While
for shop use an excessive finish is not desirable,
we must not lose sight of the fact that these are
common with all other machines were entered
for competition, and as an exposition of the
skill of the workmen employed in their con-
struction. As there is a very material differ-
ence between mere high polish and true finish
(which is instantly detected by anyone con-
versant with the subject), the latter of which
requires great skill and practice to accomplish,
it is evident that there is no good ground for
adverse criticism on the subject, as it shows the
amount of skill of which the operatives are ca-
pable. Another feature of this display, which
at once attracts the attention and admiration of
experts, is the quality of the iron used in the
castings, which present a surface almost as
fine and free from pores as a homogeneous
metal, and is capable of receiving a very high
finish.

(To be continued.)

Iron. NEW YORK.	Iron. NEW YORK.	Iron. NEW YORK.	Iron. NEW YORK.	Iron. PITTSBURGH.
OGDEN & WALLACE Successors to GAM'L G. SMITH & CO., IRON & STEEL, 85, 87, 89 & 91 ELM ST., N. Y.	G. HUERSTEL, IRON and STEEL. Warehouse, 99 Market St., N. Y. Branch Store at 213 E. 23d St., 5 doors east of 3d Ave. IRON AND STEEL OF ALL KINDS Constantly on hand. Horse Shoe Iron and Nails, Norway Iron, Cast Spring, Toe Calk, and Bessemer Steel Tire. Also, SPRINGS, AXLES and BOLTS, For Truck and Carriage Makers.	T. D. HAZARD, BROKER IN NEW & OLD RAILS, Foreign and Domestic PIG IRON, Wrought and Cast Scrap Iron AND GENERAL METALS. 204 Pearl St., New York.	HARRISON & GILLOON IRON AND METAL DEALERS, 555, 557, 559 WATER ST., and 302, 304, 306 CHERRY ST., NEW YORK. have on hand, and offer for sale, the following: Scotch and American Pig Iron, Wrought, Cast and Machinery Scrap Iron, Cap-Wheels, Axles and Heavy Wrought Iron; also old Copper, Composition, Brass, Lead, Pewter, Zinc, &c.	PENNSYLVANIA IRON WORKS. EVERSON, MACRUM & CO. Pittsburgh, Pa., Manufacturers of every description of Bar, Sheet and Small Iron, Make a specialty in Fine and Common Sheet Iron.
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Situated on the line of the Pennsylvania Rail road,
at the western base of the Alleghany Mountains, are
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1500 TONS PER WEEK,

Of Iron and Steel Railway Bars.

The Company possesses inexhaustible mines of
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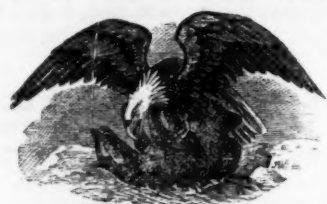
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of the Company, and the enviable reputation
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at all times depend upon receiving rails unsurpassed
for strength and wear by any others of American or
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desirable weight or design will be made to order
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**Siemens' Regenerative
GAS FURNACE.**
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PATENT

Planished Sheet Iron.

Patented March 14th, 1865; April 8th, 1873;
Sept. 9th, 1873; Oct. 6th, 1874; Jan. 11, 1876.

Guaranteed fully equal in all respects to the
IMPORTED RUSSIA IRON,
and at a much less price.

FOR SALE,
by all the principal
METAL DEALERS

In the Large cities throughout
THE UNITED STATES.

Sold by Hardware Trade.
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CURVED, STRAIGHT AND HIPED
Wrought Iron Roof Trusses, Beams, Girders & Joists,
and all kinds of Iron Framing used in the construction of Iron Proof Buildings.
DECK BEAMS, CHANNEL, ANGLE AND T BARS
curved to template, largely used in the construction of Iron Vessels.

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For Top and Bottom Chords of Bridges.
Railroad Iron, Street Rails, Rail Joints and Wrought Iron Chairs?
REFINED BAR, SHAFING, and every variety of SHAPE IRON made to Order.
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SAMUEL J. REEVES, President.

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79 Reade Street, New York. Agent for



North Carolina Handle Co.,
(WILSON & SHOBER, Proprietors.)
Manufacturers of **SPOKES, AXE, PICK, SLEDGE, HAMMER, HATCHET** and other
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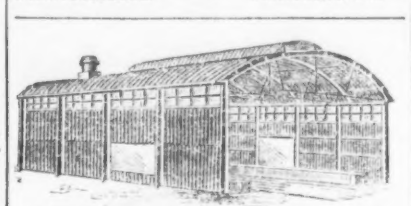
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J. & J. Rogers Iron Co.,
AUSABLE FORKS,
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Manufacturers of
FINE CHARCOAL
Blooms & Bars
For Conversion into Cast Steel.

ALSO,
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Wrought Iron Buildings, Wrought Iron Bridges, Cor-
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NAILS AND BAR IRON.
Bands, Scrolls, Horse Shoe Bars, Nut and
Rivet Iron, Oakum, Rods, Shoring, Bridge
Bolts, Ovals, Half Ovals, Half Rounds, &c.

Notice to Manufacturers of
Fruit Can Trimmings.

The superior quality and cheapness of the produc-
tion of my **PATENT FRUIT CAN TRIMMINGS** (Patented April 6, 1875), having induced
certain parties to infringe my patent, I have com-
pelled them to cease manufacturing, and I will pro-
ceed against any one who may infringe in the future.

The Very Best
FRUIT CAN TRIMMINGS,
(3 1/2 Inch Opening),
Are manufactured under process patented April 6,
1875, at the

WOODBURY STAMPING WORKS,
WOODBURY, N. J.

I am making arrangements to the end that at least
one prominent house in all the principal cities of the
United States will keep a supply of my trimmings,
for the trade.

J. M. PATTERSON,
Sole Manufacturer,
WOODBURY, N. J.

Samples furnished free upon application ac-
companied by business card.

JOHN CARVER,
Manufacturer of

Caulking Irons,
COTTON, FREIGHT & Hay Hooks, &c
285 Monroe Street, NEW YORK.

With Diston's Saws.



Sold by Hardware Trade.
LANGDON MITRE BOX CO.,
Send for Circular. **MILLERS FALLS, MASS.**

New Patents.

We take from the records of the Patent Office
at Washington the following specifications of
certain patents, lately issued, which will be
found interesting:

IMPROVEMENT IN METALLURGIC FURNACES.
Specification forming part of Letters Patent
No. 174,100, dated February 29, 1876, issued to
Joseph Williams, of Sharpsburg, Pa.

In metallurgic furnaces the gases, after per-
forming their office in the working chamber,
are usually carried off through the stack.

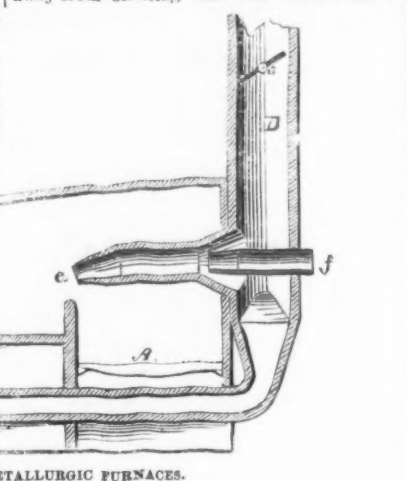
The object of this invention is to utilize the
heat which is usually carried off by conveying
the heated gases back, through the medium of
a flue, to a stack, which is placed at the end of
the furnace having the fire chamber, and con-
necting the working chamber with the stack
through the medium of a flue, in which is
placed an injecting device, which serves the
double purpose of transmitting the gases from
the stack over the fire-place to the working
chamber, commingling said gases with air,
steam, or gas, and discharging them directly
upon the working bed.

The accompanying drawing is a vertical longi-
tudinal section of improvement.

In the drawing, A represents the fire cham-
ber of the furnace; B, the working chamber;
C, the flue leading to the stack D, which com-
municates with a flue, e, passing over the fire
chamber to the working chamber. Within the
stack and flue e is an ejecting pipe, f, for di-

recting the ascending gases in the stack back
through the flue e into the working chamber
B, by forcing, through the medium of a fan or
other suitable device, a current of air, steam,
or gas through the pipe f, which currents of
air, steam, or gas will draw the gases from
the stack D, which, commingling with the currents
of steam, air, or gas, will be discharged di-
rectly upon the bed in the working chamber,
thereby greatly adding to the heat within the
furnace, and thus utilizing the heat of the
gases usually carried off through the stack.

The stack is furnished with a damper, a, which
may be utilized in controlling the volume of
gas passing from the stack—that is to say, when
the damper is closed a greater volume of gas
from the stack will pass through the flue e
into the working chamber, and when the damper
is opened a less volume will pass through the
flue e into the working chamber.



IMPROVEMENT IN METALLURGIC FURNACES.

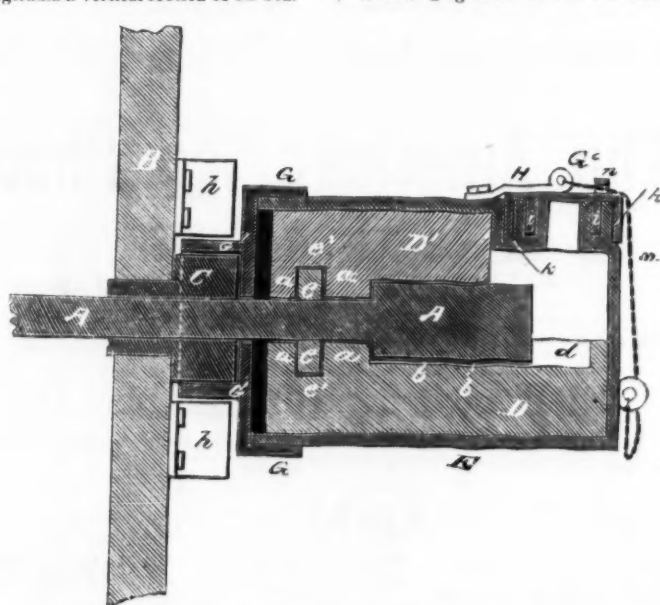
It will be seen that as the flue e is placed di-
rectly over the fire-place it will be highly
heated, restoring to the gases the heat lost
during their passage through the flue C. It
will also be seen that the mixed gases are dis-
charged directly upon the working bed B be-
fore having any opportunity to combine with
the gases rising from the fire-place.

Claim.—1. The combination, in a furnace, of
the fire-place A, working bed B, stack D, inject-
ing pipe f, and flue e, arranged to convey the
gases above the fire-place from the stack to a
point above the working bed.

2. The combination, with the fire-place,
working bed, and stack, of the injecting pipe
f and flue e, whereby the gases passing from
the stack to the working bed are reheated with-
out being mingled with the gases rising from
the furnace, as described.

IMPROVEMENT IN CAR AXLE JOURNAL BOXES.
Specification forming part of Letters Patent
No. 175,534, dated March 28, 1876, issued to
William M. Watson, of Tonica, Ill.

The figure of the drawing is a representation
of a longitudinal vertical section of oil box.



IMPROVED CAR AXLE JOURNAL BOXES.

The invention consists in the construction
and arrangement of parts whereby the box is
rendered dust-tight.

In the annexed drawing, A represents the
axle, and B the wheel, of ordinary construction.
C is a sleeve of steel, heated and shrunk onto
the axle and hardened. The journal box is
made in two parts, D D', with interior shoulders
a to correspond with the thickness of the sleeve,
and in the bottom part D of the box is a groove,

put on the axle; then the end of the box
frame is put on and shoved up to the wheel;
next, the collar, having been fitted, is heated
and shrunk on to the axle in the proper place;
and, last, the steel sleeve is heated and shrunk
on and hardened. The journal box is now put
on the axle and slipped into the frame, and the
end screwed on tight.

The opening in frame E closed by the cover
G also serves to introduce wool, cotton, or

other equally good absorbent, to keep the end
and upper part of the axle oiled by capillary
attraction, and also to examine the axle, when
necessary, in case of heating or otherwise be-
ing out of order; and, as time is of great im-
portance in running railroad trains, the open-
ing of the aperture without unnecessary delay
is of very great importance, by allowing time
to attend to the heated axle as soon as found,
without having to run for a wrench or spend
time in unscrewing the usual bolts.

If desired to use this invention to make the
car axle journal boxes now in use dust tight,
the cover and trough can be attached, and
the ring or collar on the axle and the trough
for it to turn in can be attached. The ring is
made of thin iron, and shrunk on the axle in
its proper place. The trough is then put over
it and riveted to the inside of the end of the
frame, the hoop to pass over the hub being
attached to the outside of the same end of
frame, and the fans can be attached to the
wheels in present use.

Claim.—1. For car axle journal boxes, a dust
lute consisting of a cover, G, provided with
one or more flanges adapted to enter a recess or
recesses in the frame E.

2. The journal box D D', provided with
shoulders a, groove b, oil reservoir d, and
trough e.

3. The fans h, attached to or formed on the
side of the car wheel B.

4. The flanged cover G.

5. The recess or trough i.

6. The packing k to exclude the dust.

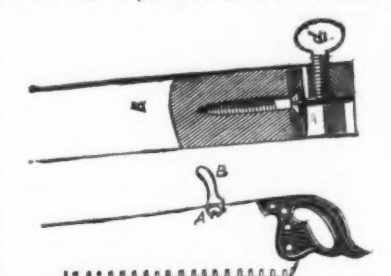
7. The catch H and chain m, in combination
with the box or frame E and cover G.

We take the following abstract of new
patents, recently issued, from the official re-
cord:

CROSS-CUT SAW HANDLE.

To Henry Diston, Philadelphia, Pa.—June 27

—The saw is provided with an additional



handle, adjustable to any desired position on
the blade.

The supplementary handle, consisting of the
gripe B, clamp A, and set screws d, all com-
bined and adapted to the blade of a saw.

179,102.—**Coal Mining Machine.**—Alex. Crombie,
Bradwood, Ill.—June 27.

A cutting wheel of large diameter revolves
beneath a frame on track wheels, the gearing
and engines lying compactly on, and being sup-
ported by, the frame in a lateral line. The
periphery has tool seats adapted to receive the
tool in either direction, there being a recess be-
tween such seats.

179,111.—**Tool Handle.**—Charles A. Hardy and
Augustus E. Stayner, Sheffield, England.—
June 27.

The pick is attached to the handle by a
socket, through which it is passed and secured
in position by a cushion and wedge working in
the socket. The cushion is provided with a
pin in its center, and the wedge with a pin
through its end, to prevent them from falling
out of the socket.

179,130.—**Pipe Bending Mandrel.**—Morris L.
Orum, Philadelphia, Pa.—June 27.

A flexible hollow mandrel is formed with a
head piece and key having a shank, whereby
the mandrel can be removed from a bent pipe.
A flexible core inside the mandrel relieves the
latter from strain and injury, and a check piece
and rod assist in withdrawing the mandrel.

179,145.—**Combined Metallurgic Furnace and**
Steam Boiler.—Thomas Ash and Zechariah
Walker, Trenton, N. J.—June 27.

179,180.—**Composition for Preventing the Fouling**
of Ships' Bottoms.—Wm. D. Folger, Calcutta,
East Indies, assignor of part of his right to
John H. Dillon, London, England, Fletcher
Westray, Alfred H. Gibbs and Jno. J. Wes-
tray, New York city, and H. H. Hamlin,
Norwich, Conn.—June 27.

A compound, consisting of sea-weed ashes,
carbolic acid and iodine, with or without coal
dust or coal ashes, as a body therefor.

179,181.—**Elevator and Carrier.**—Henry W.
Foutz, Bellefonte, Pa.—June 27.

The cheek pieces, having projections to catch
the top of the pulley block, bear against the
beam, and are held thereby in position in car-
rying. When brought to the point for lower-
ing, said pieces pass into the recesses on the
beam and release the pulley block.

179,222.—**Machine for Tapping Nuts.**—Chas. H.
Robison, Cleveland, Ohio.—June 27.

The tap splindles, spliced to their pinions,
have each a rounded collar on the upper end,
which, after the nut has been tapped and
pushed upon the shank of the tap, engage
curved and inclined ledges on the elevator, by
which they are gradually lifted up to per-
mit another blank to slide down into the nut
box.

179,300.—**Compressed Air Holder for the Engines**
of Street Cars.—John Griscom, New York, N.
Y.—June 27.

The object is to lessen the weight of the
holder; also, to sustain the heads independen-
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179,301.—**Machine for Stretching Chains.**—Charles
Hall, New York, N. Y., assignor to the Yale
Lock Manufacturing Company. Patent No.
43,987, dated Aug. 30, 1864.—June 27.

179,302.—**Steam Boiler.**—Daniel Sullivan, Bangor,
Me.—Patent No. 140,616, dated April 14, 1874.
—June 27.

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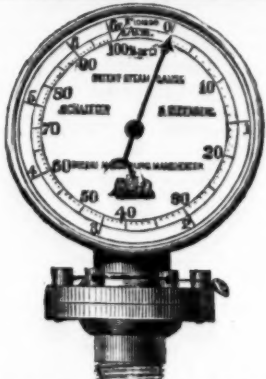
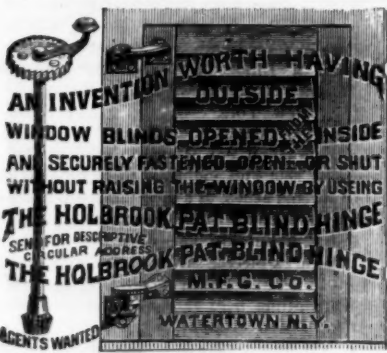
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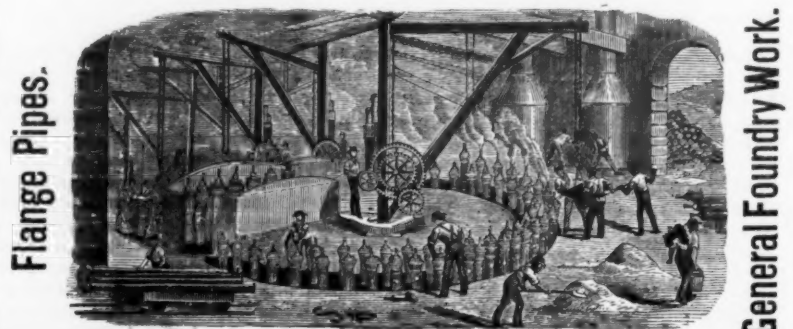
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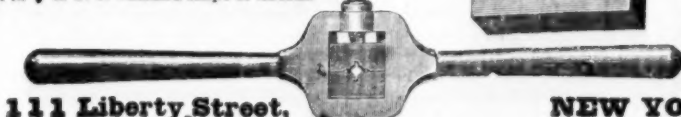
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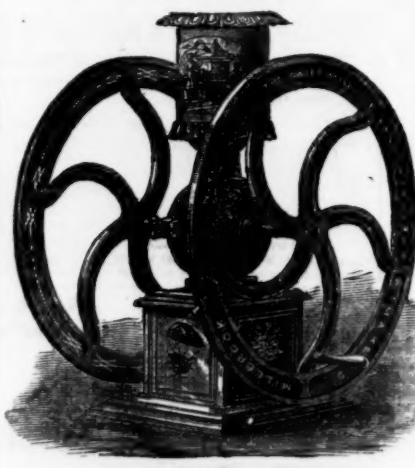
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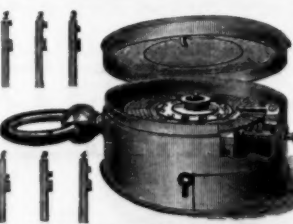
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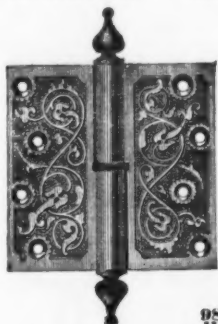
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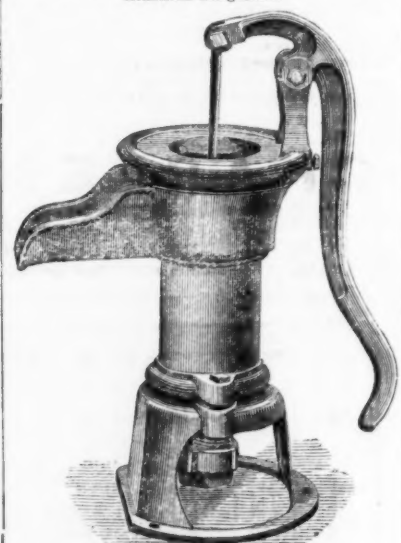


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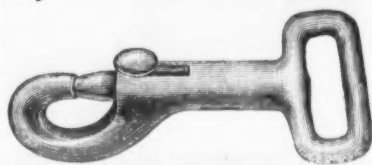
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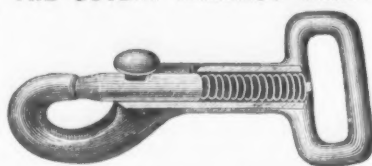
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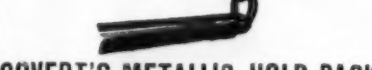
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British Blast Furnaces.

The London Iron Trade Circular says: At the present time no branch of the iron trade is attracting more interest than that of the crude iron manufacture, inasmuch as for some time it has shown greater vitality than any other branch of the iron industries. At present, robbed largely of the demand from the finished iron works, the state of the market is watched keenly by the producers of pig iron, and the slightly more hopeful signs that have become evident—in the declension of stocks at Middlesbrough, and the increased exports generally—have been received with evident tokens of relief. It may, therefore, be interesting now to indicate as accurately as possible the growth of this particular branch of the industry, and to tabulate an index to its seats and their general state, as shown by the number of blast furnaces erected in each of the great iron making districts, and by the number of these now in operation. As this last number varies quickly, absolute accuracy is improbable, but a statement sufficiently correct for comparison may be compiled.

The growth of the iron trade in Britain, or rather of the manufacture of crude iron, has been tolerably regular, and certainly unexampled by rapidly since in it pit coal was used, and the assistance of the steam engine obtained in its processes. By "the improvement in the machinery and introduction of the steam engine," the average produce of each furnace in England and Wales was raised from 251 tons to 545 tons, although the total quantities made at old charcoal furnaces decreased by the falling off in wood, and by the make of pig iron between 1740 and 1788. At this latter date there were 53 furnaces making coke pig iron, nearly one-half of which were in Shropshire, and the average produce of each being 909 tons, as against even the increased make of 545 tons at the charcoal furnaces. This date—1788—and these 53 coke using furnaces are the earliest figures, practically speaking, to which Scrivenor, in his "History of the Iron Trade," can trace the beginning of the iron trade as we now know it. Scotland at the same time had four coke furnaces at Carron, and two at Wilsontown or Cleugh, and the total make of pig iron at all furnaces in England, Scotland and Wales is stated by the same authority at 68,300 tons for the year indicated—a slender foundation for our present great trade. But the high price of foreign metal, and the increased results from the existing furnaces attracted capitalists, and by 1796, the manufacture was nearly doubled. The furnaces had increased in number—in England and Wales to 104, and in Scotland to 17; their average production, in round numbers, to 1000 tons yearly, and the exact quantity to 125,079 tons. A demand for articles of iron still further increased the number in England in 1806, there were 163 in blast and 60 out of blast—a total of 223 in the United Kingdom, and the charcoal furnaces in use had sunk to an additional 11. The average make per coke furnace was increased to 1546 tons annually, and the total make for the year named is stated at 255,306 tons. We have again, in 1823, an official statement of the number of furnaces and their make. It was 259 in the United Kingdom, and the amount made in that year was 442,066. During the six following years the increase was again large, especially in South Wales and Staffordshire, there being in 1830 no less than 360 furnaces, the produce being for that year 653,417 tons, to which the estimated make in North Wales (omitted from the return) is to be added—some 25,000 tons. In the next decade, though there was an increase numerically, the chief feature was a production doubled from 378 furnaces in blast at the end of that period. There had been in the interval experiments made to discover the best means of improving both the quantity and quality of the iron, and the result may be ascribed to the larger furnaces—higher and with increased diameter at bosh and at mouth—to an improved and better applied blast, and to better prepared materials. And it may not be uninteresting to give in contrast with a statement of our present position, Mushett's "Papers on Iron and Steel," a list of the furnaces in blast in 1839. There were then in South Wales 123 blowing; in the Forest of Dean, 5; in Shropshire, 29; South Staffordshire, 106; North Staffordshire, 7; North Wales, 13; Derbyshire, 14; Yorkshire, 22; Newcastle-on-Tyne, 5; and Scotland, 54. By 1850 the improvements to which we have referred were producing fuller results, and the make of pig iron rose to about 2,500,000 tons—the average yearly output of each furnace rising to about 6000 tons annually. A change had been observable as in progress in the localities of the seats of iron manufacture. South Wales increased in importance. North Wales and Shropshire showed signs of declension; but nothing had come of the attempts to use the Cleveland ores, and the production of Lancashire and west Cumberland was exceedingly confined. Since then that movement of change has felt the increased momentum given by the discovery of the Cleveland ore, and by the increased attention given to the hematite deposits in the northwest; and as this movement has attained probably its present climax (unless the attempts to apply Cleveland iron to the manufacture of steel should succeed) we may try to state the growth and the extent to which that growth is now utilized in the present anomalous state of the iron trade. Grouped into districts, the number of furnaces built and in blast may be thus stated:

District.	Furnaces.	In blast.
South Wales and Monmouth	174	70
South Staffordshire	120	57
Cleveland and North-East	159	118
Scotland	107	116
Northwest	95	54
Yorkshire	84	33
Derbyshire	54	35
North Staffordshire	43	24
Shropshire	24	19
Lincolnshire	19	14
Gloucester, &c.	18	11

Northampton	16	10
North Wales	13	6
Old charcoal furnaces	5	3
	981	550

As there are a few additional furnaces in course of erection, we may fairly assume that there are, in round numbers, a thousand blast furnaces in Britain, but of this available power nearly one-half is at present unproductive. The above table shows, however, that the newer districts, where furnaces larger and on the latest principles have been erected, have the greatest proportion of their productive power in use. It is difficult, however, to define the average production of the furnaces now, inasmuch as there is greater variation in the number in blast during the different parts of a year, but the fact that our make last year was above 6,000,000 tons, is in itself evidence that the average must have been very largely increased within a score of years, and it is noteworthy that the dimensions of furnaces are largely increasing. There is, however, one fact to be noticed, that a portion of the productive power must for purposes of repairs be always unproductive, and this portion will be largest in the older districts, but it is evident by the table given above that the exigencies of trade have caused the closing of furnaces far beyond the usual proportion.

And it is noticeable that though there have been developments of the iron industry in other countries—notably in America—we still have a power of manufacture of crude iron far above the United States. To our thousand furnaces they are only able to show 713, and many of these are very inferior in construction to ours. With a large portion of our furnaces idle, we made last year above 6,000,000 tons of pig iron; but in the States the capacity of production did not reach 5,500,000 tons, and the actual amount produced was very much less. And though it might be acknowledged that a cloud dense and dark hangs over the finished iron trades now, and its shadow is thrown over the parent industry, yet as we have vast stores of iron northeast and northwest, as there are fields practically unbroken in Northampton and other parts, and as we have coal and lime in abundance contiguous to these fields, we may continue to preserve our reputation as the best manufacturers of crude iron. But as the United States continues to develop the vast stores of mineral treasures long neglected, especially in the Southern States, it is probable that we shall find they will become independent of our supply, and that they may in time become competitors with us. For though the local circumstances that affect largely their manufacture now, cause the production of iron to be a dearer process in the States than here, and though with free trade we could undersell them in their own market now, yet these conditions will not always apply, for as the treasures of the States are sought, it is found that it is by no means deficient in stores of coal and iron close to each other, and there are schemes now before British capitalists by which it is proposed to utilize those stores. Whether they are carried out or not, certain it is that America must advance as an iron producing country, and though we may hold our own, it will be, in the future, with competition to which in the past we have not been accustomed.

Extinction of Fires.—A valuable invention for extinguishing fires, by Mr. Julius Hall, is illustrated by a model at the Brussels Exhibition. The main features of the design are simple. Every room in the building is fitted up with a two inch iron tube, running allround it, through the cornice, or unobscured altogether in the case of warehouses and similar structures. This tube is well perforated, so that on running a supply of water through it, a shower of spray falls all over the room. By means of suitable cocks, this system of tubing may be put in connection with any number of fire engines, and a continuous stream of water, practically inexhaustible, may be directed upon any portion of a house in flames, or throughout every room, if needful. The application of the same system to ships is a mere matter of modified detail. This appears to furnish a more certain way of bringing water in contact with flame than the present, which is to a certain extent haphazard, and it diminishes the danger to the firemen. The system might be worked by a tank on the roof; but, beside a certain amount of risk involved by having a tank in such a situation, the supply of water is always limited by the capacity of the tank, and there is a constant loss by evaporation, liable to be increased by negligence. Mr. Hall's idea seems to be a good one, and as the cost is estimated to be between two and three shillings per foot run, it is not too expensive a precaution for the large and valuable structures now so commonly built in our great cities.

The Atlantic cable telegraphic system has become such a necessity to the world that few who now read its daily supply of intelligence, important and unimportant, or who use it for the multifarious purposes of trade and information, will realize that it is only ten years since the first successful cable was laid. It was upon July 27th, 1866, that Mr. Cyrus W. Field telegraphed from Heart's Content, New Foundland, "We arrived here at nine o'clock this morning, all well. Thank God the cable is laid, and is in perfect working order." It was not until the 29th, owing to imperfect land connections on this continent, that the success of the cable was known in the United States. This was eight years after the first cable was laid in 1858, which gave a few signs and then became silent, and it was also preceded by the unsuccessful cable of 1865, which was afterward, however, recovered and successfully worked until two years ago, when it was broken and has since been silent. There are now six cables connecting Europe and America—five of them working—and there has been invested in ocean telegraphy a capital exceeding \$100,000,000.

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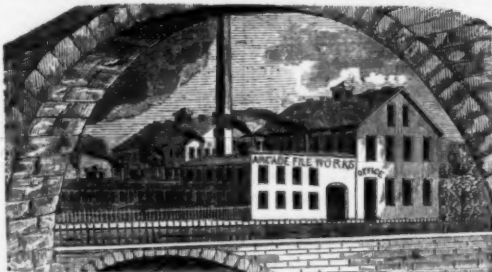


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Quality guaranteed by written warranty
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**Horse Rasps
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Made from the very best American Steel, all cut by hand,
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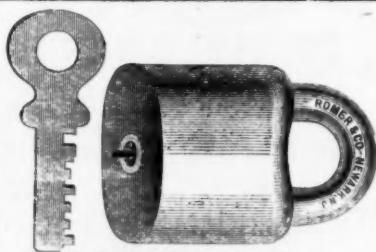


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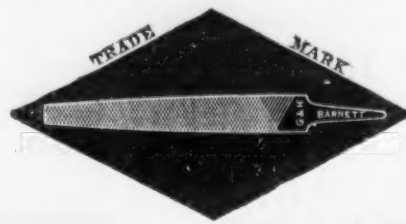
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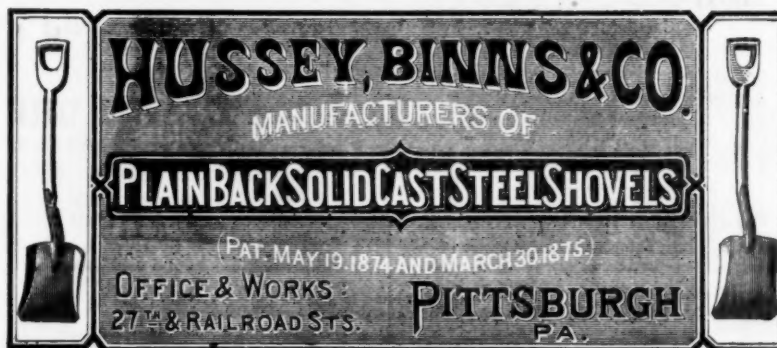
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Any variations from the regular size or shape of the above named goods made from samples, to order.

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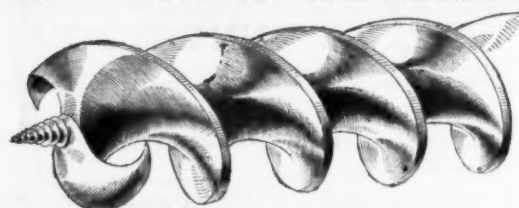
Have a patented attachment for ascertaining the tare of a dish or other receptacle used in weighing without the use of weights or loss of time.
Manufactured only by
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CLARK & CO.'S
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Self-Coiling, Revolving
NOISELESS
STEEL SHUTTERS
FOR
Store Fronts & Rear Windows.
FIRE AND BURGLAR PROOF.
Also, SELF-COILING
Wood Shutters
In various kinds of wood, suitable for Store Fronts, Private Houses, Offices, and School Partitions.
The Best & Cheapest Shutters in the World.
All Real Estate owners are invited to inspect them at the factory,
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Exposing one match at a time.
Ornamental, \$20 per gross.
Agents wanted in every county throughout the State.
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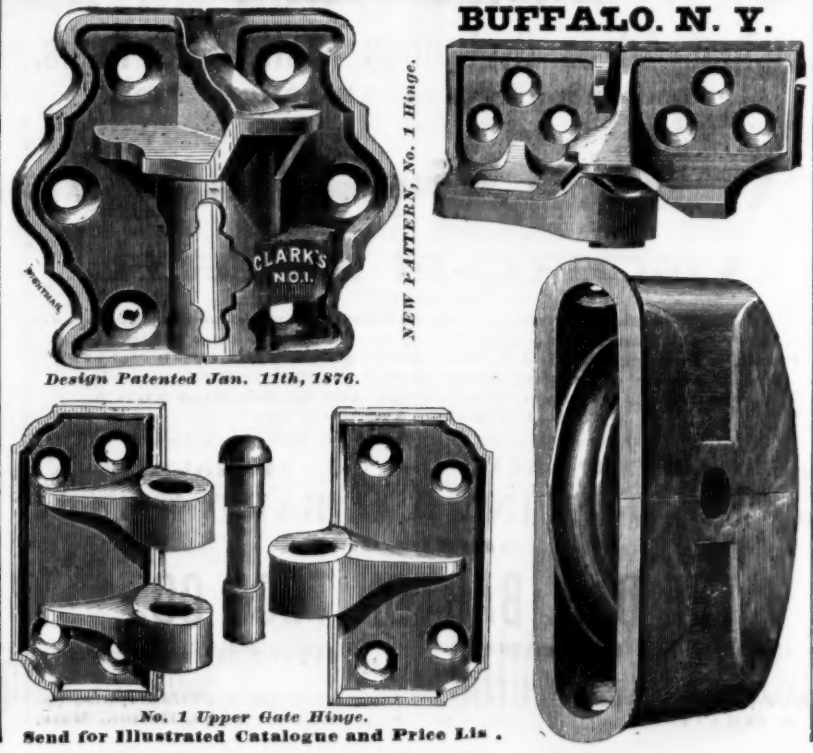


These goods have been in use over twenty years. We have reduced our List Price of Cook's Augers and Bits. Discounts remain unchanged.

Chisels, Gouges and Drawing Knives of all kinds, Screw Drivers, Screw Driver Bits, Cook's and Douglass Mfg. Co.'s Augers & Bits, Wood and Metal Head Gimlets, Improved Hollow Augers, Blake's Patent Extension Bits, Boring Machines, Chisel Handles, Wood Boxes, Tool Chests.
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THE HURRICANE FORGE.
(PATTERSON'S PATENT.)
Also Stationary Forges.
Large Size, superior to stone or brick. Can be used with bellows or fan. Send for prices and further information to
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CLARK & CO.,
MANUFACTURERS OF
BUILDERS' HARDWARE.
BUFFALO, N. Y.



BUSINESS ITEMS.

VERMONT.
The Howe Scales Company, of Brandon, employing 300 men, talk of removing their works to Rutland.

The Arlington Car Manufacturing Company, at Arlington, have failed, with \$50,000 liabilities.

MASSACHUSETTS.
The Chicopee Ames Manufacturing Company have effected a settlement with the Connecticut Screw Company, both parties waiving all damage for violation of contract. This contract was taken by the Ames Company in July, 1874, before the present administration came into power, and was the only seriously damaging contract ever taken by that company. Had the contract been completed their loss would not have been less than \$100,000.

E. W. Gilmore & Co., North Easton, make wrought iron hinges of all kinds, as strap, T, long chest hasps, and staple or padlock hinges, crate hinges and iasps, ship scrapers, heavy and extra heavy, and tree scrapers, for all markets. The factory is 150x40 feet with two 15 50x40 feet, and engine house 30x35 feet, supplied with a 75 horse-power Corliss engine and boilers.

In the North Easton shovel shops a small army of no fewer than 500 men are employed, who turn out 500 dozen of shovels, spades and scoops daily, which find their way all over this country as well as into foreign lands. A car-load has just been shipped to California, which car is not to be opened till it reaches San Francisco.

Daniel Belcher, Easton, has been established since 1837 in the manufacture of malleable iron castings of every description; he also makes metal patterns of all kinds from draft or sample. He has over 25,000 different patterns, and was the second one established in the country. It would take weeks to enumerate the different articles turned out at this furnace. The building, 200x40 feet, is supplied with an Anthony 10 horse-power engine and boiler from Miller & Hanscom, of South Boston. This furnace has some historic interest, it being the place where cannon was cast for the Revolutionary War.

Pond's Machine Shop, at Worcester, is being operated nearly up to full capacity, and there is a fair demand for tools made at this old and reliable establishment. We understand that special prices are being made on some tools to conform to the times.

NEW YORK.
The largest and oldest stove pattern shop in the world is that of N. S. Veeder, of Troy. It was established in the year 1835. Mr. Veeder himself has done very much toward bringing stove pattern making to its present perfection, both by the improvement of tools and by personal instruction and education of men employed. He is a thoroughly practical man in the business, and has done much to improve stoves. The house has facilities for turning out the very best and most approved style of work. Beside furnishing patterns for special stoves of individuals, the house deals in iron patterns in great variety, so that any stove manufactory can be readily fitted out with all the necessary iron patterns for the production of cooking and parlor stoves, ranges, and heaters. The works have long been known throughout the trade, and they still keep up their connections, not only in this country, but in Canada and Europe.

NEW JERSEY.
The Celluloid Emery Wheel Company, 228 Market street, Newark, are making an emery wheel from Wellington Mills emery, and celluloid as the binding material. The nature of the binding material used is such that glazing is said to be impossible. The reason for this is found in the nature of the celluloid, which is a mixture of gum camphor and collodion. In this case it is said the latter is a tissue paper collodion. This substance is, of course, burned at the surface of the wheel, instead of being spread out into a glaze, and so leaves a constantly clean, sharp surface, even with a speed three or four times as high as that commonly employed in similar cases. As there is no glazing it is not necessary to use a diamond tool for turning off the wheels. These wheels can be used with or without water; oils or other lubricants do not injure them, and they do not soften when exposed to dampness. On account of the free cutting of these wheels they are said not to draw the temper of tools, nor require much power in grinding.

PENNSYLVANIA.
Westerman Furnace No. 2 is turning out 34 tons of iron per day.
The Doylestown Democrat says: "The Durham Iron Works, which were in blast for the last few weeks, are again blowing out. It is the intention of the proprietors of these works to make additional alterations and modifications in the stack of the works. It has been 'scaffolding' for the last few weeks. Huge masses of ore and fuel get jammed in a manner, as it were, somewhere in the central portion of the stack, and occasionally breaking loose and falling down into the molten mass below, it occasions a tremendous outburst of gas, etc., which is not only very dangerous to the workmen on top of the stack, but endangers the very stability of the whole concern. This falling of the 'scaffolding' occurs several times a day, when huge clouds of smoke and gas may be seen ejected from the stack and floating in the air. The iron men are somewhat divided as to the cause or causes which occasion this serious obstruction to the free passage of the material on its way down the stack."
Owing to a lull in business, the Baldwin Locomotive Works, of Philadelphia, have discharged 600 workmen of all classes, whose wages ranged from \$8 to \$14 per week, aggregating \$10,000 weekly.

The Erie City Iron Works have secured a

contract for manufacturing 15 boilers of 50 horse-power capacity, to be used for pumping at the different stations on the mammoth pipe line extending from the Oil Regions to the seaboard. From this we are assured of the success of this great enterprise.

The lining of the Keel Ridge Furnace, Kimberly, Carnes & Co., Sharon, is in. The masons commenced on the hearth and boshes on Monday last. The hot blast ovens are a little behind time, but that can easily be remedied. It is the intention to blow in as soon as ready. Everything in the rolling mill is working as usual.

Furnace No. 2 of the Shenango Works, West Middlesex, blown in on Wednesday, the 9th inst., and up to Wednesday of the present week was doing well. It made four tons of No. 1 foundry the first cast, and has worked up to 20 tons a day of Bessemer the present week. No. 1 will blow in in a few weeks.

The Sharon Herald says: "The Stewart Iron Company is shipping Bessemer iron from the Valley Furnace to the Edgar Thomson Steel Company, in Pittsburgh, at the rate of about ten cars per day. If that kind of thing goes on much longer, it will soon clean up the iron yard, which will make some inducement for putting the wind to No. 1. The successful manufacture of this particular brand of pig iron places Mr. McClure one notch ahead. He produced a No. 1 Bessemer iron from purely Jackson ores, without any millinder or combination of fluxing matter whatever, a thing which nearly all of our prominent furnace men have tried, and to a great extent failed in."

The Danville Iron Works, Danville, are so busy that the proprietors have sublet 300 tons of 56 lb. rails to the Co-operative Iron Works, same place.

The Reading Hydraulic Works have just completed a blowing engine of an improved pattern for the Astral Oil Works, of New York. The engine is to supply air for agitating the oil in the tanks of the refinery which is now in process of construction. The New York office of the works is at 85 Liberty street.

PITTSBURGH AND VICINITY.
There are but three idle oil refineries in this city now, viz., the Cosmos, the Vesta and the National, which ceased operations in the early part of this month.

But five of the blast furnaces of this city are in blast, viz., Isabella No. 1, Schoenberger No. 1, Clinton, and both of the Eliza. Of those out, No. 2 Isabella is ready to blow in, and the owners are discussing the feasibility of doing so. The Lucy is being relined with 32 inch fire brick. Schoenberger No. 2 is being repaired. The two Superior are in bankruptcy; and the Sligo is out for better times.

Isabella Furnace No. 1 (18x75) has averaged 600 tons per week on the present blast.

Reese, Graff & Woods started their puddling department double turn last week. The steel mill has been running full.

Atterbury & Co.'s Glass Works will resume shortly. The new "pots" will be set next week. Jones, Ingold & Co., Pitts Steel Works, are running the melting department of their works full, the balance about half. Their gas well has a pressure of about one-half a pound to the foot and furnishes about half enough fuel to raise steam.

The Keystone Bridge Works are running nights to keep up with work. They are pushing the work on the Cincinnati Southern R. R. Bridge at Cincinnati.

OHIO.
The Columbus Machine Company, Columbus, builders of engines, blast furnace and rolling mill machinery and fittings, shafting, gearing, pulleys, brass and iron castings, &c., occupy large works covering an area of 187½ by 325 feet. They employ 63 men, and produce annually fully \$300,000 worth of work.

The Columbus Elbow Company, Columbus, manufacturers of A. Mann's patent elbow, commenced operations in June of the present year, immediately after filing their application for a patent. They have been manufacturing 60 dozen of the elbows per day, and expect from and after September to increase this to 100 dozen per day. They employ 18 men, and are erecting a building wherein to carry on the business. The elbow is casting in favor with the trade. The elbows are coated with a preparation that effectually prevents rusting; they are smooth and handsome, and are said to be very durable.

A set of rolls are being made at the Globe Works, Cleveland, for an Eastern manufacturer, for rolling iron to be used in making hexagon nuts. By this process the iron is rolled with notches on each of two surfaces of the bar, and these notches form two sides of a hexagon nut, thus about 30 per cent. of iron, heretofore considered as scrap, is saved. These rolls will be used in the Union Iron Company's mill.

The Etna Iron Works, Ironton, are running their Alice Furnace on all native ore, making an average of 65 tons per day of foundry iron, to which grades their stock is limited.

Repairs on the glass works of Kent are being rapidly pushed, and blowing will begin about September 1.

The old keg factory of the Belfont Works, Ironton, has been repaired since the fire and is better than before.

The Lawrence Mill, Ironton, was idle a part of last week by reason of the death of Mr. Geo. Watson, their superintendent at the coal banks.

The Iron and Steel Company will start their mill and furnace this week.

The Belfont Mill, Ironton, shipped 4400 kegs of nails last Monday.

The Cleveland Rolling Mill Company are building an iron hoist house for No. 1 blast furnace to take the place of a wooden one.

Bourne & Knowles' Nat. Mill, Cleveland, is running three days in the week, and the spring works four days.

The steel works of the Cleveland Rolling Mill Company stopped on Wednesday of last week on account of the displacement of the main shaft. A full week was required to repair damages.

Messrs. J. M. Sterling & J. M. Colt have purchased the Cleveland Tube Works. Steam heaters, radiators, coils, trimmings and tapers are the specialties produced at these works.

MICHIGAN.
The Marquette Mining Journal furnishes the following table of shipments from the Lake Superior iron district up to the 9th inst.:

	From	1875.	1876.
Marquette.....	256,090	240,703	
Escanaba.....	120,227	188,620	
L'Anse.....	34,918	42,319	
Total.....	411,235	471,642	

Showing an increase of 51,347 gross tons.
The Bessemer mine, Lake Superior, is again in operation. Thirty men are employed and about one hundred tons of ore are being taken out daily. The ore ranks A 1 in the hematites.

KENTUCKY.
Hunnell Furnace is about to try the coke experiment once more. She will use coke prepared from the Turkey Lick or Sheridan coal vein, mixed one-half with charcoal. A previous trial did not result satisfactorily; yet "nothing like trying."

Cutlery.



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Pen and Pocket Cutlery, Solid Steel Scissors, Shears, Razors, Russia Leather Straps, Hones, &c.

Sole Proprietors of the renowned full concave patent

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Agents for the BENGALL RAZORS.

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Manufacturers of

PATENT FINE PEN & POCKET CUTLERY

WEST MERIDEN, CONN.

The only knives made that are put together in such a manner that there is no strain on the covering or frail part of the knife. We warrant our knives equal in cutting qualities and workmanship to any made, and are acknowledged by English makers as the **Best American Knife**. We also make

NICKEL & SILVER PLATED POCKET KNIVES

which will not rust or become discolored when used as a Fruit Knife, and their cutting qualities are equal to any other knife. Orders filled from the factory, and in New York by Messrs. J. Clark Wilson & Co., No. 51 Beekman Street (who have a full stock of all patterns always on hand), and also by Messrs. G. B. Walbridge & Co., No. 99 Chambers Street.

NAUGATUCK CUTLERY CO.,

Manufacturers of FINE PEN & POCKET CUTLERY.

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ROGERS & BRO.,

MANUFACTURERS OF

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IN GREAT VARIETY.

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At each of these places a complete assortment of samples of Hardware and Fancy Goods will be found, including all new descriptions. Sole Agents for

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ESTABLISHED 1852.

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Table & Pocket Cutlery,

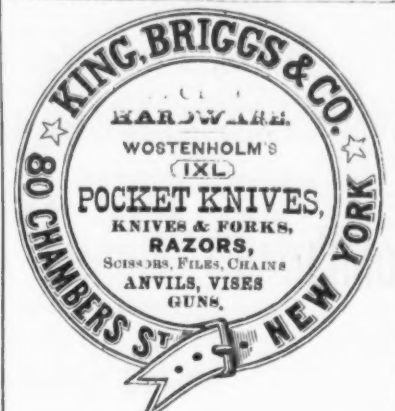
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MATERIAL.

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NO SPENCER ROTHERHAM

Granted 1777.

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PEN AND POCKET KNIVES,

MANUFACTURED BY PEPPERELL,

Aaron Burkinshaw, AB MASSACHUSETTS

My Blades are forged from the best Cast Steel and warranted. To me was awarded the GOLD MEDAL of the Connecticut State Agricultural Society; also a silver and Diplomas from the Mass. Mechanics' Ass'n. Sept., 1875.

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PASSENGER CAR LOCKS,

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The *Railway Gazette* has the following: If

an engineer from the interior of Asia or

Central Africa, and unacquainted with the im-

provements made during the present century

in engineering science, should visit our Cen-

tennial Exhibition, for studying the state of

the arts at the present time, there is reason to

believe that he would often be sadly perplexed.

He would be told doubtless by some eloquent

wretch that the "Age of Iron has been

passed," and that the Centennial anniversary

"ushered in the advent of the age of steel."

Such a visitor would undoubtedly be a guest of

the American Society of Civil Engineers. Now

we may imagine him conducted through the

halls of industry and art by the able and cour-

teous representative of the society, and on

hearing of the advent of the new age and ma-

terial may conceive of him turning suddenly to

his conductor and, with interrogation marks

spread all over his countenance, asking, "Steel,

sir; what is steel?" We may then further

imagine the attitude of the person addressed—

feet well apart, hands solemnly folded over the

pit of the stomach, head thrown back and line

of vision directed upward at an angle of about

45° to the horizon, and a slight gleam of a

hospitable smile illuminating the fringe of his

mustache, which (the smile, not mustache)

would disappear when the portentous character

of the inquiry was realized. "STEEL, steel,

steel—let me see. Mr. Asiatic or Mr. Afri-

canus," the civil engineers' representative

would blandly reply, "our Society desires me

to give all foreign members of the profession

the fullest information in its power. I will

therefore write to our secretary, so that a full

reply may be sent you."

Scene changes; rooms of the Society, East

Twenty-third street, New York. Board of di-

rectors in session. Secretary presents the fol-

lowing letter:

MR. SECRETARY—DEAR SIR: Mr. Asiatic (or

Africanus), C. E., who is here, desires to pre-

sent to his home government on his return the

fullest information concerning the advancement

of the arts in this country, and therefore de-

sires to procure such information as will enable

him to describe the material called steel, so

much used in this country, so that he may re-

port fully on its qualities, composition, etc.

Will you please procure such information as

will enable him to inform his people what steel

is? (Signed) J. B.

Secretary hands letter to President. Pres-

ident: "Gentlemen, the question for your con-

sideration is, 'What is steel?'"

First member: "Steel is wrought iron, which

hardens on being suddenly quenched."

Second member: "A compound or alloy of

iron whose modulus of resilience (or spring)

can be rendered, by proper mechanical treat-

ment, as great as that of a compound of 99.7

per cent. iron with 0.3 per cent. carbon can be

by tempering."

Third member: "Steel depends upon the

molecular condition of the metal and not on its

atomic characteristics."

Fourth member: "A product which will

forge, harden and temper."

Fifth member: "All the compounds of iron

which have been cast in malleable masses are

called steel."

The foreigner might take his choice of these,

and perhaps it would practically make very

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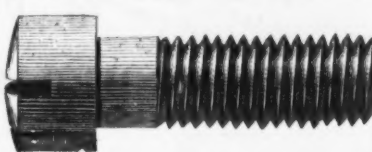
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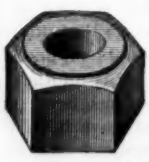
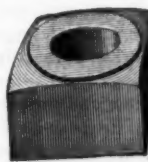
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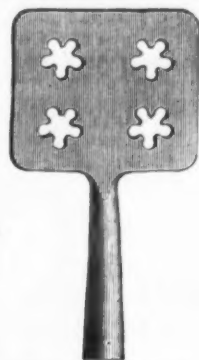
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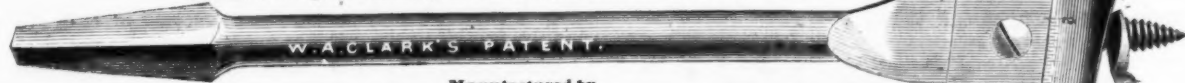
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Getting Ready for a New Start.

There are many indications to warrant the belief that we are now very close to "hard pan." If such a settling down was, as many believed, indispensably prerequisite to a recovery from industrial paralysis and commercial stagnation, we may congratulate ourselves that it has taken place easily, and that we have now reached a condition which can only change for the better. Of course, a continuation of the present unsatisfactory condition of business would mean ruin to many who have thus far managed to work along in the hope of better times to come, but this does not contradict our proposition that any change in the commercial situation is likely to be in the direction of improvement. Since 1873 there has been a steady decline in prices, until the cost of living is brought down to, and in some items below, the ante-war standard. This is a fact not generally accepted. A majority of consumers still talk about cheap times before the war, forgetting that such differences as exist between prices now and then are less than would be legitimately due to a natural appreciation in values. Take rents, for example. During and since the war we have built a very different class of stores and dwellings from those in which we were content to live and do business before the war, and in the meantime the value of land in desirable locations has increased in intrinsic value so much that real estate is now selling in many cases for less than it

is really worth. We want larger stores and finer dwellings than were deemed necessary in 1860, and the interest on the extra cost must be paid. Taking houses and stores of a given class, and comparing the rents charged for them to-day and those paid in 1860, we find that the difference is less than it would have been, by a considerable percentage, had we had no war and nothing to interfere with a steady, jog-trot progress since that year. As compared with the rents charged from 1865 to 1873, those now demanded for idle warehouses and buildings have fallen off from 35 to 50 per cent., and owners of real estate who purchased during that period, cannot begin to make interest on their capital invested. Rents must, of necessity, adjust themselves to the profits of business or buildings will stand empty. They have done so since 1873 to an extent which few of either landlords or tenants would have deemed possible five years ago.

In furniture of all kinds, the decline has been more than proportionate to that in rents, which will be easily understood by anyone who will consider the subject, even superficially. In the line of carpets, the decline is from 20 to 25 per cent., according to quality—the best grades suffering the heaviest depreciation. On cabinet work the decline has been even greater, and for a given price one can purchase a much better parlor or bedroom suit than could have been obtained in 1860. This is the only way in which the comparison can be fairly made, as furniture is not made now as it was then. In the minor articles of house furniture, the judicious purchaser can make a dollar go as far now as before the war, and, if convenience, utility and finish are considered, a good deal further. In groceries and provisions the decline since 1873 has been great enough to bring prices to the level of the ante-war average, and in some items below it. On this subject the *Tribune* says:

In groceries and provisions all goods with the exception of the hog products, beef and coffee, are believed to be at least 25 to 30 per cent. cheaper than in 1873. Canned goods, fruits and vegetables, which were once a luxury, and now so commonly used as to become a necessity, are on an average 40 per cent. below prices in 1873. Canned peaches are 20 per cent., canned corn 30 per cent., and canned tomatoes 50 per cent. lower. In 1873 family flour sold on an average at \$6.50; very low grades are now down to \$3, but they are exported to the West Indies. A fair, sweet flour can be bought for \$5 to \$5.50. Good Oolong teas are selling at retail for 40 cents. Teas are decidedly low, now that the duty is off, and of much better quality. On an average teas are 30 per cent. lower than in 1873.

The following comparison of wholesale prices in New York, will be found interesting. The figures for 1860 are taken from Hunt's *Merchant's Magazine*; those for 1873 and 1876 are from files and current issues of the leading commercial newspapers:

	1860.	1873.	1876.
Breadstuffs.			
Wheat flour, State, bbl.	\$ 4.30	\$ 6.25	\$ 4.40
Rye flour, bbl.	4.00	4.70	4.65
Cornmeal, 40 lbs. bbl.	3.00	3.80	3.80
Wheat—No. 1 sp'g. bu.	1.50	1.67	1.00
Rye—Western, bush.	.92	.98	.80
Oats—State, bush.	.46	.52	.40
Corn—Old W. m'd. bu.	.30	.66	.59
Corn—New South n. bu.	.28	.70	.63
Cotton.			
Middling upland, lb.	.11	.20	.12
Middling Orleans, lb.	.11	.21	.12-16
Fish.			
Dry cod, quintal.	4.50	5.75	4.50
No. 1 Bay mackerel, bbl.	18.00	20.00	
Hay—Shipping, 100 lbs.	1.00	1.15	.60
Hops, lb.	.16	.35	.20
Leather.			
Hemlock sole, light, lb.	.30	.38	.30
Oak sole, light, lb.	.30	.39	.35
Lime—Com. Rock'd, bbl.	.75	1.50	.75
Molasses—N. Orleans, gal.	.55	.68	.45
Naval Stores.			
Spirits turpentine, gal.	.44	.60	.39
Common rosin, bbl.	1.65	3.60	1.50
Oils.			
Crude Whale, gal.	.52	.70	.67
Crude sperm, gal.	1.40	1.55	1.30
Lard, gal.	.27	.90	.55
Petroleum.			
Crude, gal.	.11	.14	.11
Refined, gal.	.27	.36	.27
Provisions.			
Pork, mess, bbl.	16.75	13.25	18.00
Beef, plain West'n, bbl.	9.50	12.00	10.00
Beef, extra, bbl.	11.50	13.00	12.50
Hams, pickled, lb.	.09	.09	.14
Lard, Western, lb.	.10	.10	.10
Butter, prime State, lb.	.24	.32	.25
Cheese, fine factory, lb.	.11	.14	.10
Rice—Good, 100 lbs.	4.20	.84	.50
Salt.			
Liverpool ground, sack.	1.15	1.50	.90
Ashton's, sack.	1.95	3.25	3.50
Sugar.			
Cuba raw, lb.	.75	.95	.85
Refined hards, lb.	.12	.12	.11
Tallow, lb.	.10	.85	.85
Wool, Ohio fleece, lb.	.40	.70	.40

The following is a comparison of the retail prices of meats, fish, fowls, etc., in the New York markets in 1873 and at the present time:

	1873.	1876.
Porterhouse Steaks.....	35 to 38	30 to 35
Prime Ribs.....	22 to 25	20 to 22
Sirloin Steaks.....	25 to 28	22 to 25
Chuck Steaks (from neck).....	14 to 16	12 to 14
Round Steaks.....	20 to 22	18 to 20
Stew Beef.....	12 to 15	10 to 12
Corned Beef.....	10 to 14	8 to 12
Briskets.....	12 to 15	10 to 14
Mutton Chops (prime).....	25 to 40	20 to 25
Third and second grade.....	18 to 22	15 to 20
Saddles.....	18 to 22	13 to 16
Legs (prime).....	22 to 25	12 to 15
Veal, legs.....	22 to 25	18 to 22
Loins.....	22 to 25	18 to 22
Blue Fish.....	10	8
Salmon.....	35 to 40	30
Cod.....	10 to 13	8
Haddock.....	10 to 12	8
Halibut.....	40	15
Spring Chickens.....	48 to 55	38 to 42
Fowls.....	26 to 30	18 to 20
Ducks (Amel.).....	45 to 55	21 to 24
Geese (Boston).....	32 to 38	22 to 24
Turkeys.....	50 to 55	18 to 20

In the dry goods market the decline in prices has been so severe that, even on large transactions in staple fabrics, the wholesale prices have not for many months covered cost and expenses. Cottons have declined from 25 to 35 per cent., and woollens from 30 to 35 per cent. Retail prices have not declined in the same ratio, but are said to have fallen off from 15 to 20 per cent.

In hardware a comparison of 1876 currency prices with 1850 gold prices, will be found interesting. The table, which we print on the opposite page, was compiled by us for the annual report of the American Iron and Steel Association, just issued. Reducing currency to gold, we find that "hard pan" was reached in hardware some time ago. This table was prepared in the spring, and the subsequent changes in prices have not been great enough to render a revision necessary to a fair comparison of 1876 with 1860.

Comparing the prices of pig and manufactured iron with those prevailing in 1860, we find there is not much, if any, margin for further shrinkage:

	1860.	1876.
Foundry No. 1.....	\$20.00 @ 24.00	22.00
No. 2.....	18.00 @ 22.00	20.00
Gray Forge.....	17.00 @ 21.00	19.00 @ 20.00
Refined bar.....	2.50 @ 2.75	2.50 @ 2.75
Common bar.....	2.00 @ 2.15	2.00 @ 2.15
Rails.....	15.00 @ 50.00	30.00 @ 42.00

As compared with the standard immediately before the panic, wages have declined from 10 to 25 per cent. As compared with 1860, they are somewhat high, especially in the trades which have the best organization. In the following comparison the figures for 1860 are taken from Dr. Young's "Labor in America;" those for 1876 are taken from a table prepared for the *New York Times*. In both cases they give the average earnings per week:

	1860.	1876.
Carpenters.....	\$10.68	\$9.00 (8 h.) to 15.00
Cabinet makers.....	10.62	9.00 to 15.00
Bricklayers.....	12.12	12.00 to
Stone cutters.....	13.02	11.00 to
masons.....	13.12	27.00 to
Plasterers.....	12.36	12.00 to
Shoe makers.....	9.16	10.00 to 18.00
Painters.....	10.62	15.00 to
Coopers.....	9.84	10.00 to
Blacksmiths.....	9.96	10.00 to 12.00

The wages for 1876 have, we presume, some relation to the union scales. The employer who wants labor has, however, no difficulty in getting it at prices which, if paid in gold at current premium, would be as low as those paid in 1860, if not lower.

It is, we think, unnecessary to pursue these comparisons further. If there is such a thing as "hard pan," it would seem that we have reached it; if, on the contrary, we are floundering in a bottomless slough, we cannot expect to find a firm footing anywhere. We do not take this view of the situation. In our judgment, the pendulum which swung so far from the perpendicular during the five years ended with 1873, has traversed the limit of its beat in the other direction. We believe the country has witnessed all the shrinkage of values and contraction of business which it can bear, and that we are now ready for a new start. Speaking in general terms, business is more satisfactory now than it has been at any time since the panic. The movement of merchandise is large, and retailers in the West and South, while buying close, are taking larger and more varied assortments than they have needed for many seasons. Prices are so low that there is very little if any profit in doing business except at retail; but this will regulate itself as soon as people have recovered from the severe attack of economy which seized them just after the panic. The Centennial and the Presidential canvases are disturbing influences unfavorable to trade at such a time as this, but there is reason to hope that the improvement already well begun will go on without interruption, and that another year will witness a general recovery. At all events, we are ready for it, whether it comes or not; and it will come all the sooner if our merchants have the courage to resort to the usual methods of stimulating trade which, during the past two years, they have regarded as hopelessly unprofitable.

Canals as Competitors with Railroads.

Our enterprising young contemporary, the *Railway Age*, ventures an unguarded statement, which is none the less incorrect because probably made in good faith. Speaking of the several unsuccessful attempts to move the tonnage of the Erie Erie Canal by steam, it says: "At best, 'the canal can never be more than a 'partial competitor with the railroad, and it needs very great improvement to maintain a nominal competition.' We presume that this is a very fair expression of the Western estimate of the value of our State canal system as compared with the railroads, but it is wholly unwarranted by the facts of the case.

During the 15 years, from 1850 to 1864 inclusive, the New York canals, *f. e.*, the Erie proper, its branches and its extension to Lake Champlain, moved 85,700,000 tons

of freight. This whole tonnage was moved during about 105 months, or seven months of each year. During this period of 15 years, the Erie and New York Central railroads, operating during 12 months of each year—in all 180 months—carried 85,200,000 tons of freight. This gives a difference in favor of the canals of 500,000 tons of freight in 15 years, or 33,330 tons per year, the railroads having five months longer in each year to operate in. Since 1874 the business of the country has been so seriously disturbed that comparisons cannot be fairly drawn. We may say, however, without fear of contradiction, that if the railroads had not met the competition of the canals in summer by an annual slaughter of rates, which in some years have netted them a loss on every ton of freight carried, the difference in favor of the canals would be many times greater than it is. The cost of moving the canal tonnage has averaged 9½ million dollars per annum; the cost of moving the railroad freights has averaged 22-6 millions per annum. During these 15 years the canals have been greatly improved, the carrying capacity of the boats increased, and connections established between the Buffalo terminus and all the important lake ports by means of steam packet lines, so that the prospects of the canals for the next 15 years are better than they were 15 years ago. In our judgment the railroads are competing with the canals, not the canals with the railroads. It only remains to mechanically adapt steam power to the movement of canal tonnage, to make it difficult for the railroads to maintain even a nominal competition with our great State water way from Lake Erie to the Hudson. Indeed, steam will do for the canal boat what the locomotive has done for the freight car—with this difference, that one good boat will carry as much freight as a train of 20 to 25 cars. The ultimate success will be won, many times over, the cost of the experiments which are leading up to it gradually but, we think, surely.

"Tap" and "Flue" Cinder.

At many of the older rolling mills in the country, large piles of cinder are to be found, which, at the time they were accumulated, were both a nuisance and an expense, as well as representing a costly waste product of the boiling and heating furnaces. Its value is now better understood. At one mill we have visited, an extension was built over a pile of cinder that had been thrown into a hollow, and so valuable had it become that the owners were seriously discussing the tearing down of the mill structure to reach the cinder.

Of late years these piles of boiling and puddling cinder, or "tap" cinder, as it is generally called, have not been allowed to accumulate, but are being used largely in blast furnaces as a mixture, with very good results when the proportion is kept low. With the rich and pure Lake Superior ores it forms a very good mixture, and the iron is much improved where the proportion of cinder does not exceed 25 per cent.; but in this practice the cinder is from boiling furnaces where Iron Mountain or the best Lake Superior ore is used for fix or fettling. At some furnaces a much larger percentage of cinder is used. At one on the Ohio River the charge is 75 per cent. cinder and 25 per cent. Lake Superior ore, but the iron produced, while it is weak and sells at a less figure than the Lake iron made with a larger amount of ore, forms, nevertheless, a very good mixture with the charcoal irons of the Hanging Rock region, and is used for hoops and sheets, the cold-short tendency of the iron giving the product a very fine gloss and surface.

Several furnaces have been built at or near these piles of old cinder, before alluded to, with a view of smelting it, and they have been very successful. The iron yielded is very close and silvery, but it works in the puddling furnace better than one would suppose from its appearance. There is another use to which boiling cinder has been put that, five years ago, would have been considered impossible. It is noticed that in running furnaces on Bessemer pig the walls will build out and the furnace become "choked." When this occurs the furnace is commonly put on mill iron. This scours it out, and it is gradually worked back to Bessemer again. Some furnaces in the West have been very successful in remedying this difficulty by the use of a small percentage of cinder, not to exceed 10 per cent., and often less. The furnace has been kept open, the run on Bessemer continued, and by care as to the quality and amount of cinder used, the iron has been good enough for use in the Bessemer process.

We need hardly refer to the well known use of puddling cinder in the puddling process, as this is so old that its advantages and disadvantages are fully understood. But the merits of heating cinder are not so generally acknowledged. Indeed, it has only been within the past two

or three years that it has been used in the blast furnace in connection with ore, and now some of our best iron-masters use it freely. Early in 1874 we tried to convince some blast furnace men that heating cinder, or "flue" cinder, was as good as "tap" cinder for their use, if not better, and all but one ridiculed the idea. This one, who made as good iron as the best, said but little, but took us aside and asked us not to say too much, as he was buying all the flue cinder he could find, and using it.

Prof. E. B. Andrews, of the Ohio Geological Survey, while engaged in his work was struck with the idea that theoretically at least, the heating cinder should be the purest and best, and had some selections of tap and flue cinder analyzed by Prof. Wormly, chemist of the survey, with the following result:

	No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
Silicious matter.....	30.00	29.50	31.05	31.31	31.00	31.20
Protoxide of iron.....	30.00	29.50	31.05	31.31	31.00	31.20
Besemboxide of iron.....	30.00	29.50	31.05	31.31	31.00	31.20
Metallic iron.....	1.30	1.25	1.30	1.30	1.30	1.30
Manganese.....	1.30	1.25	1.30	1.30	1.30	1.30
Lime.....	1.40	0.44	1.10	2.50*	6.42*	1.05
Magnesia.....	1.30	1.30	1.40	0.83	1.30	1.30
Phosphoric acid.....	1.247	0.54	3.30	0.83	0.97	0.90
Sulphur.....	1.30	1.30	0.33	0.17	0.71	0.35
Total.....	99.257	100.00	99.31	99.80	100.00	99.34
Metallic iron.....	50.50	52.55	44.95	53.10	52.51	54.00
Phosphoric acid.....	1.347	0.54	3.30	0.83	2.54	0.90

* The upper figures, phosphate of lime; lower, carbonate of lime.

caloric engine, brought out in its household form in the year 1857. The smallest of these engines was probably not more than $\frac{1}{4}$ of a horse-power. In coal consumption they were a long way in advance of the small steam engines of the time. They had a pretty fair sale, more than 500 being in use in 1861, and no doubt did much toward creating a market for small motive powers. From this time the problem of small and economical steam engines received careful attention from engineers, and since 1869 or 1870, the number has increased rapidly.

For the small manufacturer, the engine with boiler attached is probably the best and most convenient. The steam user is thus relieved from the necessity of setting up and connecting the boiler, and is sure of having obtained one suitable for the machine he purchases. Of the small engines in the market, one may obtain almost anything from a 10 horse-power portable down to the well known dollar engine, which develops under ordinary circumstances, $\frac{1}{33,000}$ of a horse-power.

Practically, from 1 to 5 horse-power are the sizes that are in the greatest demand. Engines by themselves are very cheap, simple affairs, the cost of the boiler often being greater than that of the engine. One of the first requirements is safety in the boiler, because, as a rule, the combined engine and boiler does not have the same attention that it would have in a larger machine. This point has received a good deal of attention from manufacturers, and there are a large number of boilers which are practically free from danger of explosion. The danger to persons and property from rupture is not, however, a very serious one, as the pressure carried is usually not high, and the quantity of water small. The great point to be feared is the destruction of the boiler itself. Some forms of boilers in the market are likely to be injured if the water is not strictly attended to, and, as the cost of the boiler is about five-eighths of the total cost of the whole power, this is a matter of much importance. Upright tubular boilers have certain advantages on this account, because a variation of the water level is a matter of little moment. Some of the very best engines in the market labor under the disadvantage of having a crown sheet almost horizontal, and within a few inches of the surface of the water. There are other boilers in which there would be little or no danger should the water fall far below the proper line. Boilers are also in use, and doing good work too, which are largely composed of cast iron. They are, of course, very cheap, but as yet we have heard little complaint of them. Some of the larger sizes of boilers, say for 5 and 10 horse engines, do not seem to be turning out so well. They are probably too cheap, and consequently the work has to be slighted.

It is not always necessary for the mechanic, or small manufacturer, who wants a little power, to buy a boiler, as he is often so located that he can get steam from a neighboring boiler. This is, we suppose, in most cases much less expensive than hiring power direct. The friction of shafting running when not wanted, the first cost and the cost and care of maintaining it, are all greater than the cost of a steam pipe, keeping it protected and paying for condensation, &c. In such a case a part of the amount which the boiler would have cost can be advantageously expended in getting a better class of engine. The smallest engine in the market, in a regular way, suitable for general use, is of 1 horse-power and capable of working up to somewhat more than that. In a shop, such an engine will accomplish as much work, if it is regular and continuous, as two or even three men. It may not be out of place here to make a remark about the work which an engine can perform, as compared with men or animals. The latter are always capable, when called upon, to exert for a few seconds or even minutes, a power many times greater than that which they can steadily maintain. Thus, a man, according to the usual estimates, is able to exert about one-tenth of a horse-power at continuous labor, but when called upon to put forth his utmost strength he can, for a short time, develop very nearly a horse-power, and we have seen instances in which a man for 8 or 10 seconds at a time has exerted considerably more than a horse-power. We have seen a young man work at the rate of 39,000 foot pounds per minute, the time being but a few seconds. Hence it follows, when men or animals furnish the motive power, a wide variation may take place in the work to be performed, without making any increase in the number of men or animals necessary; they exert a little more strength for the moment, and the task is accomplished. The case is different with a steam engine. If made only large enough to do the average work, it may be stalled when required for a short time to produce

ten times its ordinary power. Hence, in buying, when determining the size needed, it is necessary to take into account the irregularities of the service, as well as the average amount of work to be done. The engine must be large enough to run the machinery when the greatest strain comes upon the motive power, and this sometimes makes it necessary to obtain a 3-horse engine, when a half a horse-power would be ample to do the average work. The difference in the size of these small engines does not, however, make a great difference in their cost, as the amount of labor expended upon a 3 horse-power engine is not much greater than that required for a 1 horse-power. A 1 horse-power engine and boiler, with pump, gauge cocks and other necessary attachments complete, ready to run, as soon as smoke and water pipes are connected, can be obtained for \$150, and we think there is an engine even cheaper than this and of the same size. From this figure up there are all sorts of prices, according to the finish and style of the engine. A very good 3 horse-power engine and boiler may be obtained for \$250 or \$300. One manufacturer makes a very fair 4 horse-power machine for the same price, our only doubt in regard to it being the calking of the boiler, which, we fear, has not always been first-class. There are several other engines, however, of almost precisely the same type and the same price. These are of the vertical pattern, bolted to the boiler, and generally without a frame. This has its advantages in making the engine less expensive to build, and consequently cheaper, but usually it keeps the whole engine hot, slightly increasing the danger of hot boxes, and makes the care of it less convenient. But few of these small engines are of the horizontal pattern, the vertical style being somewhat more in fashion. Both styles have certain advantages. Where the engine is mounted in such a way that it can be disconnected from the boiler and set at a distance, it is often a great convenience in a shop. The kind of work has something to do with the style of engine selected, but, after all, it is best to buy as good an engine as one can afford; hence, the price and the power are the most important points to be taken into consideration, and when these points have been decided, the steam user should get as good a machine as the money will buy.

It was our intention not only to discuss the subject of small steam engines, but also to speak of the advantages attending their use wherever steam-power of any kind is needed. The discussion of this portion of the subject, together with some suggestions concerning the management and care of small engines by persons not skilled in this kind of work, can profitably be taken up at some future time.

Anthracite.

On another page will be found an interesting account of the breaking up of the anthracite coal combination on Tuesday last. The event is of great importance, as about 500,000 tons are to be thrown on the market at auction, and, contrary to the general supposition, these sales will, in all probability, be *bona fide* and without reserve. These auctions are announced for next Tuesday. In the meantime sales are made, as the rule, on the basis of the circulars to be issued after the auction. One of the large companies has made a temporary scale which is from \$1 to \$1.50 per ton below the prices fixed by the combination for August. The feeling in the coal market is that "the bottom is out," and that the future is wholly uncertain. It is impossible to make any quotations, and the only reason which the companies have in quoting prices at all, in advance of the auctions, is to enable those who wish to buy now to take advantage of the low figures. The commercial aspects of the break in the combination will be more apparent a week hence than they are now.

Principles of the Construction of the Steam Hammer.

BY EDWIN L. WALLIS, M. E.

(Continued.)

VALVE MOVEMENT.

In large hammers the valve is always moved by hand. Various forms of automatic gear have been invented, but for forge work the necessity of regulating every blow has led to the abandonment of automatic gear, and the valve now used almost universally is a simple balanced valve, worked directly by a lever. The disadvantage of this valve is that in case of carelessness on the part of the man at the lever, the top of the cylinder may be blown off, or, in fact, the whole hammer destroyed. On this account there should be used on steam hammers some device to insure cutting off at the point fixed in the analysis, viz., $\frac{1}{4}$ feet, but otherwise to leave the valve entirely in the control of the man at the lever. Such a device could be easily and cheaply made, and, in case of inattention, would save from destruction the hammer itself and the lives of the men working it.

THE PROPORTIONS OF THE RAM.

Since the whole moving weight is to weigh 30,000 lbs., we must deduct from this the weight of the piston and rod. Assuming these to weigh 1 ton, we have left for the weight of the ram 28,000 lbs. Since a cubic foot of iron weighs 482 lbs., the requisite volume of the ram is 64.8 cubic feet.

The relative proportions by which this volume is secured are entirely arbitrary. There are, however, certain considerations which influence the choice of proportions. If we make the ram long and of small area, we secure greater elasticity, but this is accompanied by a loss of pressure when the blow is struck. If we make the ram short and of large area, we gain in the pressure due to the blow, but this pressure may become so severe as to crack the ram. Good proportions for a ram of this size are: Length, 7 feet; breadth, 4 feet; thickness, $2\frac{1}{4}$ feet. This apparently gives a greater volume than is necessary, but as a large hole is left in the ram for the introduction of the piston rod and fastenings, these proportions will prove in the end to give approximately the correct volume.

PROPORTIONS OF THE FRAMES.

It is difficult, if not utterly impossible, to arrive by exact analysis at the various strains produced in the frames by blows struck under varying conditions. Theoretically, we can see no reason why any but mere static stress should come upon them, being due to the weight borne and to the pressure of the steam. Even when the blow is struck with the full steam pressure from above, the stress on the frames is not directly increased except by the trifling amount due to the *vis viva* of the steam flowing through the pipes. When side blows are struck by the hammer, a side stress is thrown upon the frames, but it is useless to attempt to calculate the strains, as they vary with so many independent conditions. It is these cases that the factor of safety is designed to cover.

Although under some circumstances an actual upward pressure may come upon the frames, still it is but slight, and if we proportion the frames to resist the ordinary downward pressure, we need have no fear of the upward pressure. The weight borne equals the weight of the hammer itself, plus the pressure of the steam.

As for the weight of the hammer we can only arrive at that by an assumption, as it depends upon the dimension which we seek. We might, perhaps, form for the stress a general equation embodying the weight, but it would be more curious as a work of mathematics than useful as an engineering formula. We therefore assume the weight as near as we can judge. Assume the weight = 45 tons. The upward pressure of the steam is approximately 27 tons, and this added to the weight gives 45+27=72 tons as the total downward pressure on the frames. The reaction at the foot of each standard is $\frac{1}{2} \times 72 = 36$ tons. The moment of stress on the standard equals the reaction, minus the weight of the part directly over it multiplied by the lever arm. The weight of the vertical part may be estimated at 3 tons. Since the frames are 10 feet inside measurement from the center, and the distance of the guides from the center is 2 feet, the length of the lever arm is 8 feet. The moment of transverse stress on the horizontal portions of the frames equals $(36-3) \times 8 = 364$ ft. tons = 6,336,000 inch lbs. The easiest method of proportioning the frames to resist this is by trial and error; that is, assume a size and examine its strength. The frames have, of course, the form of the double T, the lower flange being the larger, since the frames are in the condition of a beam supported at the ends and loaded uniformly, and also a load at the middle.

Assume the section as follows: Depth, 3 feet; thickness of flanges and web, 3 inches; width of upper flange, 16 inches; width of lower flange, 3 feet. The moment of resistance of this section is 46,314,000 in. lbs., thus giving for the up stroke a factor of safety of $\frac{46,314,000}{6,336,000} = 7.3$. On the down stroke the pressure of the steam no longer acts downward but upward, and the weight borne by the frames is diminished by the steam pressure above the piston. This steam pressure equals about 30 tons. We have, therefore, 45-30=15 tons as the weight supported, and proceeding in the same way as before we have for the moment of stress $(15-3) \times 8 = 96$ ft. tons = 2,304,000 in. lbs. We have, therefore, on the down stroke, when all the shocks are to be borne, a factor of safety of $\frac{46,314,000}{2,304,000} = 20.1$, and from these factors of safety we may reasonably expect perfect security against breakage.

Beside the transverse stress thrown upon the frames the reaction at the supports tends to rotate the frames about the top, or, in other words, to spread the frames, and they must be secured by bolts. The size of the bolts is given by the equation: reaction \times its lever arm = $T \times$ its lever arm where T =stress on bolts. For this stress a lever arm of 21 feet may easily be secured in hammers of this stroke, hence we have $36 \times 8 = T \times 21$, from which we have $T = 13\frac{1}{2}$ tons, as the stress on the bolts if placed 21 feet below the top.

The entablature at the top of hammers bears the weight of the cylinder and the pressure of the steam. Assuming the weight of the cylinder at 10 tons, the weight supported equals 10+27=37 tons, and this is distributed as a uniform load. Treating the entablature as a beam supported at the ends and loaded uniformly, for which the moment of stress equals $\frac{1}{8} w l^2$ we have $\frac{1}{8} w l^2 = 1.6 R b d^2$, and, since all the quantities except b and d are known, these may readily be determined.

MASONRY UNDER HAMMER.

As we have seen in the analysis of the cylinder the maximum upward pressure on the cylinder cover is 183,060 lbs. = about 91 tons, which must be resisted by the weight of the hammer

Comparison of Wholesale Prices of Hardware in New York—1860 and 1876.

ARTICLES.	Quantity.	Description.	Gold—1860.	Currency—1876.
Axes.....	Per dozen		\$9.00 @ 10.00	\$9.00 @ 10.00
Augers, cast steel.....	"	1 and 2 inch.....	2.88 @ 5.76	4.00 @ 8.00
Auger Bits.....	"	$\frac{1}{4}$ inch.....	1.44	1.54
Chisels, socket framing.....	"	1 and 2 inch.....	4.80 @ 6.00	4.80 @ 7.20
Chisels, socket firmer.....	"	Per set.....	3.50	3.00
Hammers, best cast steel adze-eye.....	"	Nos. 1, $1\frac{1}{2}$, and 2.....	9.50, 8.50, 7.50	9.85, 8.50, 7.43
Hatchets, best abutting.....	"	Nos. 1, 2, 3.....	6.00 @ 7.50	5.70 @ 7.00
Hatchets, common.....	"	Assorted.....	8.00 @ 4.25	3.57 @ 4.29
Pick Axes, best.....	"	Assorted.....	8.00 @ 9.00	7.50 @ 9.00
Wrenches, screw, Coe's genuine.....	"	12 inch.....	9.10	7.75
Wrenches, screw, Taft's.....	"	12 inch.....	5.40	3.78
Saws, hand, 26 in.....	"	Common.....	6.85	6.00
Saws, hand, 26 in.....	"	Good.....	10.85 @ 19.88	11.90 @ 19.12
Saws, cross cut.....	Per foot		37c. @ 48c.	36c. @ 48c.
Saws, back.....	Per doz.	12 in. com. and best.....	10.88 @ 13.80	10.30 @ 15.30
Planer, double iron jack.....	Each		52c.	54c.
Brass Rocking Cocks.....	Per dozen	$\frac{1}{2}$ inch.....	5.95	4.05
Brass Bibbs, plain.....	"	$\frac{1}{2}$ inch.....	17.00	12.00
Molasses Gates, Stebbins.....	"	No. 2.....	4.00	2.70
Brass Butts, middle (pairs).....	"	2 inch.....	77c.	1.00
Cast Butts, loose joint (pairs).....	"	3x3 inch.....	89c.	80c.
Wrought Butts, fast joint (pairs).....	"	3 inch.....	52c.	54c.
Strap Hinges, light (pairs).....	"	6 inch.....	66c.	54c.
T Hinges, light (pairs).....	"	6 inch.....	54c.	48c.
Wrought Iron Hooks and Staples.....	Per pound		5c. @ 6c.	5c. @ 6c.
Carriage Bolts, best.....	Per gross	4 inch.....	42c.	32c.
Carriage Bolts.....	Per hund.	$\frac{1}{2}$ x 3.....	1.48	1.40
Curry Combs, 6 bars open.....	Per dozen	5 16x2 1/2.....	1.04	94c.
Measuring Tapes, 50 ft., asses' skin.....	"	No. 1.....	75c.	72c.
Brick Trowels.....	"	10 1/2 inch.....	5.43	5.00
Anvils, steel face, Eagle P. H.....	Per pound		6.8c.	8c.
Bench Vices, Wilson's.....	Each	No. 3.....	3.08	2.93
Nails.....	Per keg	10d.....	2.75 @ 3.25	2.75
Rules.....	Per dozen	No. 68.....	1.50	1.44
Levels.....	"	No. 9.....	6.00	6.48
Try Squares.....	"	7 1/2 inch.....	3.45	2.88
Squares, iron.....	"	No. 2.....	3.75	4.50
Fry Pans, iron.....	"	No. 3.....	2.62	2.38
Coffee Mills, box.....	"	No. 1.....	3.00 @ 12.00	2.82 @ 10.00
Enamelled Kettles (4 quart).....	Each		45c.	40c.
Cast Steel Shears, trimming, com.....	Per dozen	8 inch.....	5.90	3.55
Cast Steel Shears, best.....	"	8 inch.....	6.00	4.90
Cut Tacks, full 1/2 wt.....	Per paper	8 ounce.....	1.95c.	3.15c.
Iron Shoe Nails.....	Per pound		6 1/2 c.	8c.
Shovels.....	Per dozen	No. 2.....	4.98 @ 10.00	6.30 @ 10.00
Cast Steel Dividers, Bin's.....	"	7 inch.....	4.98	5.12
Cast Steel Dividers, others.....	"	7 inch.....	3.90	3.90
Casters, table, iron wheel.....	Per set	Nos. 1 @ 6.....	6c. @ 13c.	5 1/2 c. @ 11c.
Casters, table, brass.....	"	Nos. 1 @ 6.....	10 1/2 c. @ 39c.	11c. @ 30c.
Meat Cutters, Hale's.....	Per dozen	No. 12.....	21.00	20.73
Counter Scales, Hatch's.....	"		21.60	25.20
Tea Scales, Hatch's.....	"		10.00	10.00
Door Knobs, mineral.....	"	No. 400.....	1.25	1.12 @ 1.20
Door Knobs, porcelain.....	"	No. 300.....	1.25	1.50 @ 1.69
Screws, iron, for wood (same proportion for other sizes).....	Per gross	1 inch, No. 9.....	24 1/2 c.	15 1/2 c.

and masonry. The weight of the hammer is about 45 tons, which together with base plates would bring the weight up to about 60 tons, leaving 31 tons to be resisted by the masonry. The material most desirable for this purpose is some hard, heavy and cheap stone, such as trap rock, the weight of which, as given by Molesworth, is 170 lbs. per cu. ft. We have

$\frac{170}{365 \text{ cu. ft.}} = 170$ and, using a factor of safety of 6, we have 2190 as the number of cu. ft. of masonry required, and of this 1065 cu. ft. weighing 93 tons are under each standard. The fastenings must be able to bear this, but their distribution and the proportions of the masonry are arbitrary. The estimated weight on the foundation of the hammer is:

Weight of hammer, base plates, &c..... 60 tons.
Weight of masonry..... 186 "

Total..... 246 "

ANVIL BLOCK AND ELASTIC SUBSTRATUM.

The falling weight and the parts which receive the blow must be proportioned to resist impact. In the investigation of the stresses produced by a blow, it is impossible to arrive at an exact result. The laws of resistance to impact, as laid down in Weisbach and Mosely, which are accepted at present, and by which the stresses are calculated, make no account of certain conditions which undoubtedly enter and modify the result, though to what extent is uncertain. When a blow is struck, some of the energy of the moving mass is transformed into heat, so that the assumption that all the energy given up produces a mechanical effect is erroneous. This error is probably very slight, and, at any rate, the mistake is on the safe side, because, if we proportion the parts to resist all the force of impact, the factor of safety is increased when we have to resist the impact due to the energy diminished by the amount of heat developed. By far the most serious error in the formula is that they make no account of time. We do not know how the element of time enters to influence the force developed by impact, but that it does enter is certain. The formula assumes that the compression produced is uniform throughout the whole length of a piece, and equal to that which would be produced by a static pressure equal to the force developed. With a very rapid blow this may be partially untrue, because if we subject a long rod to a blow in the direction of its axis, the end which receives the blow may be crushed, while the other end is not seriously damaged. In this case the energy of the blow is expended on the one end before the rod has time to transmit through itself that portion of the energy which each part of the rod would otherwise receive.

In the investigation of the force developed these two errors are neglected, and the formulae as developed in Weisbach and Mosely, are accepted as correct. The plan followed to determine the weight and proportions of the anvil block is that pursued in a paper by Mr. Thomas Gillot:*

Let L_2 =length of block in feet (vertically).
 λ_2 =compression produced in block in feet.

K_2 =area of block in square inches (horizontally).

K_1 =area of block in square feet. $K_2 = 144 K_1$.

E_2 =coefficient of elasticity of block.

L_1, λ_1, K_1 , &c., corresponding quantities of substratum of timber.

The object of the investigation is to determine the proper weight of the block, and for

this purpose the preceding values are assumed as follows:

$L_2 = \frac{1}{4}$.

$K_2 = 144$.

$E_2 = 20,000,000$ lbs. = 10,000 tons.

$L_1 = 6$ feet.

$K_1 = 144$ square feet. $K_2 = 20,736$ square inches.

$E_1 = 1,500,000$ lbs. = 750 tons.

* The timber may safely be subjected to a driving pressure, in addition to the weight of the hammer and block, of

p =pressure per square inch of substratum = 1000 lbs.

P =total pressure on timber = 10,386 tons.

And this pressure must not be exceeded.

The pressure on the block equals, from the mechanics,

$\frac{K_2 E_2 \lambda_2}{L_2} = P$ and the pressure on

the timber = $\frac{K_1 E_1 \lambda_1}{L_1} = P$, and since these pressures are mutual, they are necessarily equal to each other, and we have

$\frac{K_2 E_2 \lambda_2}{L_2} = P = \frac{K_1 E_1 \lambda_1}{L_1}$

From the first of the preceding equations we find $\lambda_2 = .0018$ feet, and from the second we find $\lambda_1 = .004$ feet.

The total work of compression equals one-half the product of the force into the compression, hence the energy expended in compressing the block and the timber equals

$u = \frac{1}{2} P (\lambda_2 + \lambda_1) = \frac{1}{2} (60+1344) \text{ ft. tons.}$

This amount of work can safely be taken up at this point, and we must so proportion the block that the quantity of work expended between these materials shall not exceed the given amount.

Let w_2 =weight of ram = 15 tons.

w_3 =weight of block.

V =velocity of hammer before impact.

v =velocity of hammer and block after impact; then

$v = \frac{w_2 V}{w_2 + w_3}$

The work accumulated in the hammer at the moment of striking = $\frac{1}{2} M V^2$, and the work remaining in the hammer and block after impact equals

$\frac{1}{2} m_1 v_1^2 + \frac{1}{2} m_2 v_2^2 + \frac{1}{2} m_3 v_3^2 = \frac{1}{2} \frac{1}{(w_2 + w_3)^2} \frac{1}{w_2} (13364)^2$

This work is entirely used up in the compression of the anvil and timber, hence we may put

$\frac{1}{2} (60+1344) = \frac{1}{2} \frac{1}{(w_2 + w_3)^2} \frac{1}{w_2} (13364)^2$ from which

$w_3 = 60+1344 - w_2 = 205 \text{ tons.}$

The maximum total weight on the foundation of the block, and which the foundation must be able to bear, is estimated as follows:

Weight of block as calculated = 205 tons.

" hammer, assumed = 15 "

" timber substratum..... 22 "

Maximum driving pressure..... 10,386 "

Total..... 10,628 "

The foundation necessary to bear this pressure, as well as that necessary to bear the hammer itself, is readily found from the well known laws of the bearing power of a pile foundation as laid down in Weisbach.

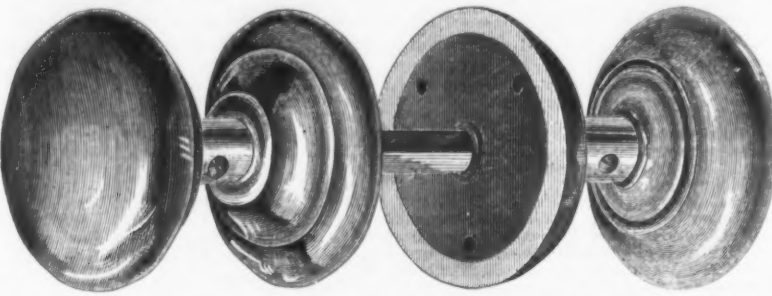
(To be continued.)

The St. Louis Galvanizing Company, St. Louis, Mo., which have been in operation about 6 months, is the only company of the kind in the State. They are at present employing about 25 hands, and have a capacity for turning out about 10,000 lbs. per day. They are making corrugated car and house roofing. They have a growing trade which promises well.

* See Van Nostrand's Magazine, vol. vii., p. 307.

Wood Lock Furniture.

Our illustration shows a new and very attractive style of door knob, manufactured by the Ornamental Wood Company, of Bridgeport, Conn., which we think cannot fail to recommend itself to public favor. Its beauty of finish and neat bronze mountings render it pleasing in appearance, and very desirable from its durable and substantial character. It is perfectly plain so as to be easily kept free from dust and dirt, the same as porcelain or metal knobs; at the same time it is like the latter, impervious to the action of the weather or water. It can be furnished in any light or dark wood, such as rosewood, walnut, maple, ash or apple, to suit the tastes of the trade, and, being highly



polished, shows perfectly the beautiful grain of the wood. The price of this knob, \$12.50 per dozen list, brings it within the reach of a large class of trade. It is particularly desirable for residences, public buildings, &c.

Sanford's Improved Pipe Cutters and Threaders.

We show in the accompanying illustrations two ingenious and effective tools invented by Mr. Gileston Sanford, and introduced to the trade by his agent, Mr. John W. Quincy, No. 98 William street, New York. Fig. 1 is a screw

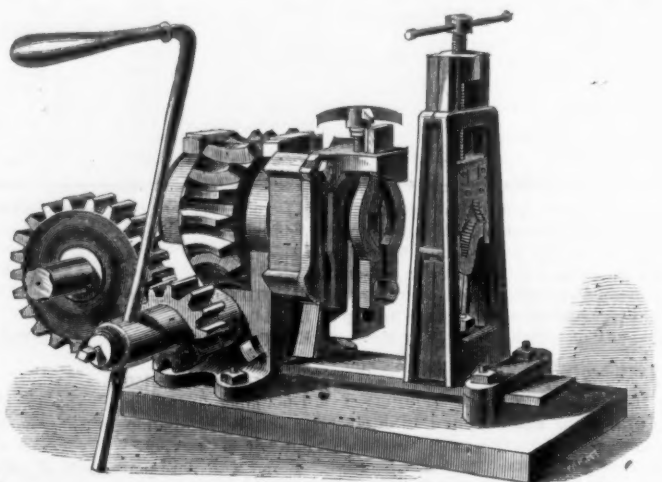


Fig. 1.

gear pipe and thread cutter. The common square die is used, and is secured in the end of the tube or hollow shaft next to the vise, and rotates by means of the worm and gear, which is speeded 17 to 1, which makes it very powerful. The speed can be increased or diminished by changing the spur gears on the shafts. The

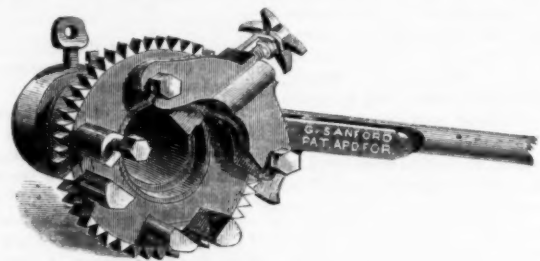


Fig. 2.

cut-off is self-operating, and is removed when the die is used for threading pipe. It will cut off or thread from 1/4 to 3 inch pipe, and can be used by power by putting a pulley on either shaft, or it can be driven by a turning lathe by attaching a turning dog to either shaft.

The tool shown in Fig. 2 is a ratchet pipe cutter and threader. With this machine one person can cut off a pipe 1 1/2 to 2 inches, or cut a screw on the same, in half the time that two men usually take with the common stock and die. With the ratchet and lever it can be used in many places where the ordinary cutter cannot. The lever can be lengthened as power may be required, it being in two lengths. The cut-off attachment is self-acting, and can be removed when the dies are used. It has a leading screw to force the die on the pipe. It is adapted to all work, is portable, light and inexpensive.

Centennial Notes.

CRANE BROS. MANUFACTURING CO., Chicago. In the Hydraulic Department of Machinery Hall this firm make a very large and varied display, and one that is creditable to themselves and the city which they represent. Our notice must necessarily be brief, the exhibits being too numerous to be described in detail. Among steam pumps they display the auxiliary valve steam pump, for which they claim, as special features, simplicity, durability, positive action and high speed. They also exhibit the duplex fire engine pump, which is specially adapted for fire purposes, and for raising water to a great height, and is said to throw a perfectly steady and more powerful stream without jar in the hose than can be obtained by the use of a single pump. Both pumps can be seen in operation in the Hydraulic Department. Probably the most important article which they exhibit is Crane's direct-gear, automatic safety hoisting engine.

These elevators are said to possess, in mechanical construction and safety appliances, improvements which are not equaled by any other elevator in the market. The wearing parts are of the best construction, accessible, easily adjusted and thoroughly reliable. In this engine the crank shaft gears directly into the winding drum, and the link motion (with its complications) usually applied to this class of machines is dispensed with, both of which improvements simplify this machine to a great extent. The firm manufacture three sizes, which are adapted to all classes of furnaces and mines. The blast furnace machine has two devices for stopping automatically at the landings. The starting is done by the Barrow runners at the top of the furnace, which do away with the two engine drivers usually employed for that purpose. The machine for coal or other mines is of similar construction to the above. The operating cable is conveyed from the engine in position

to the top of the shaft. A boy, or one of the car runners at the top of the landing, can stop and start the engine, thus dispensing with the services of a skilled engineer. In no case can the engine overwind the cables. The automatic stop always stops the engine when the platform reaches the proper point. These devices for safety prevent accidents, which are in many cases accompanied by loss of life. This firm also display a very handsome model of a hydraulic elevator, which is at once simple, convenient and economical. We believe they are largely used in the Western cities, and are worthy of a careful examination. A very fine passenger elevator is also exhibited, which is simple in construction, easily managed and offered at a low price. The space occupied by

the firm is surrounded by radiators finished in various styles—plain, chocolate, bronze, gold, &c. They also display wrought iron pipes, valves, and a fine line of shafting; also brass fittings for steam engines and castings in every variety. As we said before, the exhibit is too extensive and varied to be noted in detail, and so far as we have seen, it is one of

the most important displays from the West, and on that account, in addition to its genuine merit, is worthy of a careful inspection.

Special Notices.

MANUFACTURING BY CONTRACT.

Our facilities are unusually extensive and complete for manufacturing small articles in

Special Hardware, Tools & Machinery. Are prepared to fill orders promptly and at low prices. Our reference is our work.

THE HULL & BELDEN CO., Danbury, Conn.

The "Common Sense" Hay Cutters, "VICTOR" CORN SHELLERS, And "PRIZE" CHURN are the best. A. B. COHU, Manufacturer, 197 Water St., one door from Fulton, New York.

"Everything for the Farm," containing illustrations of 200 of most improved implements for Farm, sent on receipt of fee.

E. HAMILTON HUNT, Hardware Commission, 69 LAKE ST., CHICAGO.

Consignments solicited. Best of references in New York and Chicago.

Office of POPE, WILLIAMS & CO., CHATEAUGAY LAKE, May 1st, 1876.

We have placed the exclusive sale of our CHATEAUGAY STEEL IRON in the hands of Messrs. Naylor & Co., 99 John St., New York; 208 South 4th St., Philadelphia; 6 Oliver St., Boston, who will hereafter act as our agents, and to whom all orders should be addressed.

Yours, truly, POPE, WILLIAMS & CO.

Special Notices.

Hardware at Auction.

BISSELL, WELLES & MILLET,

Will hold at their Salesrooms,

No. 15 Murray Street, N. Y.,

THEIR FIRST FALL

TRADE SALE

Of Hardware, Cutlery, Guns, French Tinned Ware, &c., &c.

ON TUESDAY AND WEDNESDAY, the 29th and 30th of August, COMMENCING AT 10 1/2 O'CLOCK, A. M.

This sale will embrace about 1800 lots of desirable goods of the usual variety, suitable for city and country trade, consisting of Shelf and Heavy Hardware, 300 dozen Shovels and Spades, a large line of Cutlery, and a full assortment of French Tinned Ware. This is a very desirable way of replenishing stocks from first hands, and we cordially invite our friends to attend the sale.

BISSELL, WELLES & MILLET,

Auctioneers,

15 Murray Street, N. Y.

Notice to Manufacturers of Cast Iron Water Pipe.

Sealed proposals will be received at the office of the Board of Water Commissioners, No. 97 Washington Street, Hoboken, New Jersey, until 8 o'clock P. M., Thursday, August 31st, 1876, for furnishing the following Cast Iron Water Pipes: Two thousand and five hundred (2500) feet of sixteen (16) inch; five thousand (5000) feet of twelve (12) inch.

Five thousand (5000) feet of six (6) inch, and the necessary branches and bends. To be made of a good quality of iron, the pipes to be cast vertically, bell end down. Tested and inspected under a hydraulic pressure of three hundred (300) pounds to the square inch. To be free from defects of all descriptions.

To be coated with tar while hot inside and out. The pipes to weigh on an average as follows: The sixteen inch one hundred and twenty-five (125) pounds to the lineal foot.

The twelve inch seventy-five (75) pounds to the lineal foot, and the six inch thirty (30) pounds to the lineal foot.

Proposals to be sealed and indorsed. "Proposals for furnishing Cast Iron Water Pipe," and directed to the Board of Water Commissioners of the City of Hoboken.

The Board reserve the right to reject any or all bids if deemed for the interest of city so to do.

By order of the Board of Water Commissioners.

M. H. MURPHY,

Registrar.

SECOND-HAND MACHINERY.

AT EXTREMELY LOW PRICES.

One 2000 lbs. Ferris & Miles Steam Hammer; one 1000 lbs. Ferris & Miles Steam Hammer; one Reverbatory Furnace, with Roller attached, connected with 3000 lbs. Hammer. Eight small Heating Furnaces for anthracite coal. Twelve round open Hearth Forges (wrought iron). Eleven wrought iron Anvils, each weighing 200 lbs. and over. One Oliver with two Hammers. One Bennett 4 inch Bolt Cutter. Two 2-spindle Bolt Cutters, cuts 1/2 in. to 1 1/2 in. One Die Dressing Machine. Two Double Nut Tapping Machines. One Rotary Nut Tapping Machine. One single-spindle clutch Bolt Cutter, cuts 1/2 in. to 3/4 in. bolts. One Punching Machine, punches 3/4 in. hole through 3-16 in. iron. One Punching Machine, punches 1 in. hole through 1 in. iron. One Punching Machine, punches 1 1/2 in. hole through 1 1/2 in. iron. One Punching Machine, punches 1 3/4 in. hole through 1 3/4 in. iron. One Plate Shears, receives blades 36 in. long, and will shear 3/4 in. iron. One Alligator Shear, cuts to 2 in. rods. Two Rotary Planers. One Channel Bar Drilling Machine with 2 spindles adjustable. One Link Boring Machine, bed 48 ft. long, with 2 heads. One Hardway Bolt Heading Machine, heads 3/4 in. to 1 in. bolts. One Bolt Heading Machine, heads 1/2 in. to 3/4 in. bolts. One Rivet Heading Machine.

GEORGE PLACE,

121 Chambers & 103 Reade Streets, N. Y.

NOTICE.

Water Filters.

BATTERSEA, LONDON, July 1, 1876.

We beg to advise the trade and public that we have a pointed Mr. H. R. MESSING, 62 Water St., N. Y., sole agent for the sale of our well known Silicated Carbon Water Filters.

SILICATED CARBON FILTER COMPANY.

SPECIAL NOTICE.

Having established ourselves in business in this city for the sale of

AMERICAN HARDWARE, HOUSE-FURNISHING GOODS, AGRICULTURAL IMPLEMENTS, &c., &c.,

we beg to solicit correspondence with parties desirous of being represented by us in Germany and surrounding countries.

HAMMACHER & DELIUS.

HAMBURG, Germany, April, 1876.

House in N. Y., A. HAMMACHER & CO., 209 Bowery.

SPECIAL NOTICE.

A new style of

MEN'S SINGLE GUNS,

in addition to the former line of A. Simon's, Liege, now offered.

SILESIA SHEET ZINC,

Imported by

LOUIS WINDMULLER & ROELKER,

20 Reade Street, N. Y.

TO INVENTORS AND MANUFACTURERS.

The 4th Exhibition of the American Institute will open September 8th. Machinery will be received after August 14th, other goods after August 24th. Termed awards and a Special Gold Medal for this year. For particulars, blanks, etc., address "General Superintendent American Institute, New York."

Specialties of Wrought, Cast, or Sheet Iron or Brass,

Made to order in a SUPERIOR MANNER, AT LOW PRICES, by the

CORRUGATED METAL CO., East Berlin, Conn.

Revised to date..... 75c

Wrought Hinges and Butts..... 75c

Cast Hinges and Butts..... 75c

Boiler..... 10c

Dayton & Lamberson, 97 Cham bers St., N. Y.

Special Notices.

BY THOMAS F. STEWART.

ESCANABA FURNACE.

Trustee's Sale

OF Very Valuable Charcoal Furnace, Situate at ESCANABA, MICH., AT AUCTION.

The undersigned will offer at Public Sale, at the Chamber of Commerce, in the city of Pittsburgh, on Thursday, September 21st, 1876, at 2 o'clock p. m., the very desirable property known as the Escanaba Furnace, with all its appurtenances, together with about Thirty Thousand Acres of Woodlands, very carefully selected by experts, on which have been erected 49 Charcoal Kilns. The Furnace is 12 feet high, 51 feet long, built of brick, with a large open hearth, with Buildings, Foundations and Hoisting Machinery for a second stack, all constructed in the best manner. There are numerous Tenement Houses, Store House and other buildings, and a large dock on the bay, adjoining the Furnace, with very superior facilities for obtaining limestone.

In addition to the realty is a large amount of personal property, comprising about 15,000 cords of Wood, a large quantity of Limestone, Iron Ore, Charcoal, Goods in Store, Wagons, &c., &c., which will be sold in conjunction with the realty. This property must be sold for account of creditors. It is probably one of the best Charcoal Furnaces in the country, the woodlands affording an almost unlimited supply of hard wood, and must, in the near future, become very valuable. It presents rare attraction for capitalists. For particulars apply to Trustee, at Pittsburgh, who will furnish schedule of personal property.

J. R. McCUNE, Trustee.

THOMAS F. STEWART, Auctioneer.

WANTED.—A first-class business man familiar with machinery and manufacturing, capable of handling large bodies of men, desires a responsible position. References satisfactory. Address,

IRON AND STEEL,

Care of P. O. Box 813, Bridgeport, Conn.

HALL & HARBESON,

Manufacturers of

Chemical & Physical Instruments,

191 Greenwich Street, N. Y.

SPECIALTY.—BENSON'S GAS BURNERS, for all heating purposes, in Improved Gas Combustion Furnaces, with 10, 15 and 25 burners. Fine Brass and Metal Work made to order for Metallurgists, Chemists, Experimenters, Colleges, &c.

TO LET,

A Light, Handsome Office.

Possession Immediately.

HERMANN BOKER & CO.,

101 Duane Street, N. Y.

FOREMAN WANTED.

In the machine shop of an Agricultural Works, located in a flourishing Western city, building from two to three thousand reapers and mowers per year. Must be a thorough mechanic, active, systematic, careful and have a thorough knowledge of the business. Applications addressed to

Western Agricultural Works

Care of The Iron Age, 10 Warren St., N. Y., accompanied with reference, will receive attention.

NOTICE! POND'S TOOLS.

The undersigned has assumed the Personal Property, including accounts, finished and unfinished Machinery, good will &c., connected with the manufacture of MACHINIST'S TOOLS as conducted by Mr. Lucius W. Pond, since 1874, and will continue the said business at the old stand, cor. Union and Exchange Sts., Worcester, Mass., under the name of DAVID W. POND, Successor to Lucius W. Pond.

CARD.—Having assumed the business mentioned above, I solicit Inquiry and Patronage, with guarantee that present standard of Workmanship, and quality of Machinery shall be maintained. A large quantity of New and Second-Hand TOOLS, ALL STYLES AND SIZES, For Sale at Low Prices. Send for list of second-hand tools. Store at 98 Liberty St., New York, will be disco tinued from Feb. 1, 1876, and all sales made from manufactory.

Respectfully, DAVID W. POND,

Successor to LUCIUS W. POND.

MANUFACTURERS

desirous of introducing their goods to the British and Continental Markets, are advised to insert advertisements in the newspaper "IRON," published every Saturday, at 99 Cannon Street, London, E. C.

SCALE: First 3 lines, 3/4; every additional line, 10d.

Price, 6d. per Copy, or 30/ per annum, inclusive of postage to the United States.

Steel Castings.

Solid and Homogeneous. Guaranteed tensile strength, 2 tons to square inch. An invaluable substitute for expensive forgings, or for Cast Iron requiring great strength. Send for circular and price list to

CHESTER STEEL CASTINGS CO.,

Evilina St., Philadelphia, Pa.

ATTENTION

Is invited to the fact that the Labels used on my Goods, were entered according to Act of Congress in the year 1876, in the U. S. Patent Office.

IN ADDITION to a full line of Extension Lip, Car, Machine, Dowel and Hand Rail Bits, also of Boring Machine, Carpenters' and Millwrights' Augers. All my goods are solid CAST STEEL, and perfectly made by means of my Patent Machinery.

SPECIAL NOTICE.

I have three patents for Dies, Machinery, and Tools for making Augers and Bits, each running seventeen years; dated as follows: Dec. 19, 1865; January 31, 1866, and July 3, 1866. There is a special claim on each of the Dies. All persons infringing on said patents will be held responsible to the extent of the law. Russell Jennings.

DEER RIVER, Conn., Sept. 7, 1874.

Wanted—A Partner,

In a foundry and machine business, already well established. Locality splendid and healthy. A practical man with means is wanted to join a practical man who is already well established.

Address CAR WHEEL FOUNDRY,

P. O. Box 134, Selma, Alabama.

Briesen's Patent Agency

FOR SECURING INVENTIONS, TRADE MARKS, &c., IN AMERICA AND EUROPE.

No. 258 Broadway, New York.

A. V. BRIESEN.

VENTILATING & STEAM HEATING.

A thoroughly competent engineer, with extensive experience in the above line, desires employment.

Address M.,

Office of The Iron Age, 10 Warren St., N. Y.

Special Notices.

Photo-Lithograph Maps,

30x36 inches, of Chattanooga Mineral District, embracing most of that wonderful mineral region of East Tennessee, Western North Carolina, Northern Georgia and Northern Alabama; giving fully and accurately the general character of the Mountains, Rivers, locations of principal Towns, Furnaces and Rolling Mills, Railroads, &c., &c.; in fact being the most accurate Map ever gotten up of the District which embraces a region of country of about 80 miles radius from Chattanooga.

Published and sold by the Centennial Committee of Chattanooga Mineral District.

S. B. LOWE, Sec'y, Chattanooga, Tenn.

W. D. VANDYKE, Treasurer.

Sent free by mail on receipt of 25 cents.

A. PURVES & SON,

Corner South & Penn Streets, Phila.,

Dealers in

Scrap Iron & Metals, Machinery, Tools,

Shafting & Pulleys, Steam Engines,

Pumps & Rollers, Copper, Brass,

Tin, Babbit Metals, Foundry

Facings. Best Quality Ingot Brass.

Cash paid for all kinds of Metals and Tools.

EXPORT TO RUSSIA!

Having established ourselves in this city for the sale of American Machinery, Hardware, Agricultural Implements and Technical Products generally, we beg to solicit correspondence with manufacturers desirous of being represented in Russia. Familiar with the wants of the country, and, as civil engineers, brought in contact with the industrial interests, we are enabled to introduce successfully American products to the trade.

Address HARTOCH BROS.,

Kasanka 46, St. Petersburg,

Russia.

PIG IRON and ORES.

J. F. JAMES, Chattanooga, Tenn.

Special attention given to orders from Southern Foundries. Advances made on consignments of Pig Metal and Warehouse receipts given upon arrival in store yard.

DROP FORGINGS.

The TRENTON VISE & TOOL WORKS, Trenton, N. J., having increased their facilities, are now able to do all kinds of

Iron and Steel Drop Forgings

in quantities to order at reasonable rates.

HERMANN BOKER & CO., Proprietors,

101 & 103 Duane St., N. Y.

S. B. LOWE,

Chattanooga, Tenn.

Dealer in METALS and ORES. Special

rates of freight to all principal points in the United

States and Canada.

For Sale, &c.

RARE BUSINESS CHANCE.

The best Hardware and Paper Hanging stock in the city of Taunton. Business stand superior to any other, and rent low. Will be sold at a bargain. Thorough chance for investigation given.

Address, Box 3465, Boston Post Office,

Or A. W. BANGS & CO., Taunton, Mass.

For Sale.

Hardware Business

In a city of 16,000 to 18,000 inhabitants, near New York, long established, and doing a good business, surrounded by a fine agricultural district. Satisfactory reasons given for selling. Address,

"HARDWARE,"

Office of The Iron Age, 10 Warren St., N. Y.

FOR SALE OR TO RENT.

The valuable property known as the BOONTON IRON WORKS, situated at Boonton, Morris Co., New Jersey, now in complete working order. Also in connection with the same valuable mining properties, adjacent to the above, if desired.

Apply to JNO. CROSBY BROWN,

EDWARD C. LORD,

GEORGE DE FOREST LORD,

Executors of Estate of J. COUPER LORD.

For Sale!

Owing to the death of the senior partner, the surviving partner is desirous of disposing of that part of the business of the firm comprising the Stove and Tin trade. Would dispose of the entire business, including Agricultural Implements, Hardware, Paints, Oils, &c., if desired. Terms easy with good security.

L. PEASE & SON,

Hartford, Vermont.

Trade Report.

Office of THE IRON AGE.
WEDNESDAY EVENING, August 23, 1876.

During the past week the topic of chief interest in the financial markets has been the effort of Mr. Secretary Morrill to form a syndicate which would undertake the negotiation of the whole or part of the new 4½ per cent. issue of bonds authorized by law. Thus far his efforts have been unsuccessful, but it is believed that the difficulties will soon be overcome, and the differences among the rival applicants adjusted satisfactorily. The effect of a successful negotiation on gold would be as follows: If more of the 4½ per cent. bonds are taken in this country than the amount of 6 per cents held here which will be called in, the stock of gold in the Treasury and the country will be reduced. If more of the 4½ per cents are taken in Europe than the amount of 6 per cents held there which will be called in, then the stock of gold here will be augmented. As every previous refunding negotiation has drained gold from this country the chances are that the one now proposed will. The effect of a successful negotiation on the investment market will be to enhance the value of all first-class securities which pay from 5 to 7 per cent. and above; formerly, or soon after the war, 6 per cent. was the lowest standard rate for strictly choice investments; within the last few years that has been reduced to 5 per cent.; if it now becomes 4½ per cent., then, as said, securities which pay 5, 6, 7 or a higher per cent. ought to advance.

The money market remains very easy. Borrowers on call are freely accommodated at 1 @ 2 per cent. The quotable rate of discount on prime commercial paper is 3 @ 4 per cent.

The following table shows the extreme daily range of the gold premium since our last report:

	Highest.	Lowest.
Thursday.....	111½	111
Friday.....	111	110½
Saturday.....	110½	110
Sunday.....	110½	110
Tuesday.....	110½	110
Wednesday.....	110½	110

Silver in London has ranged between 53½d. per ounce and 51½d. Small change continues scarce, and commands a premium of ½ @ 1 per cent. The silver dollar which it is proposed to restore would have been worth, at one time during the week, about 90 cents, gold, and at another, no more than 86½ cents. The gold value of the United States legal tender note for \$1 ranged during the week between 89½ cents and 90½ cents.

Government bonds were weak, and, for the short date issues, lower. Those of long date were firm but a trifle lower. The causes are fully set forth in a preceding paragraph. State bonds are generally dull, and railroad mortgages are strong and in very good investment demand. We give below the closing quotations of governments.

In the stock market the decline in anthracite coal shares has given a stimulus to speculation. The transactions have been mostly small, but blocks in the market have been knocked about with great freedom. They have dropped from 2½ to 5 per cent. since Tuesday morning, and are now quoted as shown in the table printed below. The principal dealings of the week have been in Lake Shore, D. L. & W., Western Union, Michigan Central, Erie and St. Paul.

The bank statement shows a reduction in surplus reserve of \$2,190,375, the banks now holding about \$21,000,000 lawful money above the legal requirement. The principal changes are reductions of \$1,218,000 in specie and \$1,098,900 in legal tender notes; both changes were in part if not entirely caused by the Treasury operations in connection with the sale of \$2,160,000 five per cent. bonds belonging to the Alabama Indemnity Fund, and to this conversion of the gold received therefor with legal tender notes, these notes having been transferred from the banks to the Treasury. By reason of this Treasury disturbance of the market the statement does not balance, the reduction in deposits being about one-third of what it should be to make the statement balance.

The following is a comparison of the bank averages for the past two weeks:

	Aug. 12.	Aug. 19.	Differences.
Loans.....	\$233,075,800	\$233,339,400	Inc. \$263,600
Specie.....	21,092,000	19,873,400	Dec. 1,218,600
Legal tendr's.....	54,083,300	57,854,300	Inc. 3,771,000
Deposits.....	226,515,100	226,000,000	Dec. 515,100
Circulation.....	15,373,900	14,714,600	Dec. 659,300

The foreign trade movements for the week are shown in the following tables:

	1874.	1875.	1876.
Total for week.....	\$6,871,325	\$7,600,230	\$5,179,595
Prev. reported.....	358,646,302	220,544,770	185,514,617
Since Jan. 1.....	\$265,517,587	\$288,145,000	\$190,694,212

Among the imports of general merchandise were articles valued as follows:

	Quant.	Value.
Animals.....	250	\$2,212
Brass goods.....	36	2,982
Bronzes.....	16	3,035
Chains and anchors.....	16	1,364
Cutlery.....	80	20,326
Gas fixtures.....	6	389
Guns.....	2	2,370
Hardware.....	35	3,233
Iron, pig, tons.....	284	8,874
Iron, other, tons.....	109	4,635
Iron ore, tons.....	690	1,180
Metal goods.....	220	14,010
Needles.....	14	4,112
Old metal.....	1,538	1,538
Platina.....	2	4,875
Plated ware.....	2	164
Per. caps.....	2	413
Saddlery.....	6	961
Steel.....	1,947	14,925
Spelter.....	314,344	11,698
Tin, boxes.....	18,507	99,254
Wire.....	1,119	9,059
Zinc.....	70,938	4,658

EXPORTS EXCLUSIVE OF SPECIE.			
For the week ended Aug. 22:			
	1874.	1875.	1876.
Total for week.....	\$5,660,310	\$4,997,855	\$5,163,132
Prev. reported.....	186,611,106	155,435,789	164,609,192
Since Jan. 1.....	\$192,271,425	\$163,238,144	\$169,772,324

EXPORTS OF SPECIE.			
For the week ended Aug. 19:			
	1874.	1875.	1876.
Total for week.....	\$577,800	\$577,800	\$577,800
Previously reported.....	38,480,922	38,480,922	38,480,922
Total since Jan. 1, 1876.....	\$39,058,742	\$39,058,742	\$39,058,742
Same time in 1875.....	38,238,404	38,238,404	38,238,404
Same time in 1874.....	39,602,471	39,602,471	39,602,471
Same time in 1873.....	38,825,239	38,825,239	38,825,239
Same time in 1872.....	55,840,411	55,840,411	55,840,411

Government bonds closed about steady. The latest quotations were as follows:

	Bid.	Asked.
U. S. Currency 6s.....	126½	126½
U. S. 6s 1881, reg.....	119½	119½
U. S. 6s 1881, con.....	119½	119½
U. S. 5-30 1885, reg.....	114½	114½
U. S. 5-30 1885, con.....	114½	114½
U. S. 5-30 1885, new reg.....	115	115½
U. S. 5-30 1885, con.....	115	115½
U. S. 5-30 1887, reg.....	119	119½
U. S. 5-30 1887, con.....	119	119½
U. S. 5-30 1888, reg.....	119½	119½
U. S. 5-30 1888, con.....	120½	121½
U. S. 10-40 reg.....	116½	116½
U. S. 10-40 con.....	119½	119½
U. S. 6s 1881, reg.....	116½	116½
U. S. 6s 1881, con.....	116½	117

The following are the closing quotations of active shares:

	Bid.	Asked.
Atlantic & Pacific R.R. Preferred.....	114	114½
Atlantic & Pacific Telegraph.....	37½	38
Chicago & Northwestern.....	38	39
Chicago, Rock Island and Pacific.....	62½	63
Chic. Bur. & Quincy.....	115	116½
Col. Chic. & Ind. Cent.....	38½	39
Clev. Col. Cin. and Indpls.....	41½	43
Cleveland and Pittsburgh.....	93	95
Chicago & Alton.....	98	100
Chicago and Alton Preferred.....	104	104½
Consolidation Coal.....	40	40½
Canton.....	30	35
Del. Lack. and Western.....	87½	88
Delaware & Hudson Canal.....	84½	86
Adams Express.....	112	114
American Express.....	61½	62
United States Express.....	62½	64
Wells, Fargo & Co. Express.....	85½	86
Erie.....	13½	13½
Harlem.....	137	139
Hannibal & St. Joseph.....	11	12
Illinois Central.....	89½	90
Kansas Pacific.....	5	7
Kansas & Texas.....	8	9½
Lake Shore.....	84½	85
Michigan Central.....	41½	41½
Morris & Essex.....	95	96
Milwaukee & St. Paul.....	36½	36½
Mariposa.....	6	6½
New York Central.....	7	9
New Jersey Central.....	107	107½
New York Southern.....	53	53½
Ohio & Mississippi.....	13½	13½
Pacific Mail.....	24	24½
Pittsburgh & Fort Wayne.....	130	135
Pacific of Missouri.....	102½	103
Quicksilver.....	13	15
St. L., Kan. City Northern.....	14	18
St. L., Kan. City Pref.....	31	31½
Tol., Wabash & Western.....	2	2½
Union Pacific.....	62	65
Western Union Telegraph.....	71½	71½

GENERAL HARDWARE.

This market has been visited during the week by a large number of buyers from the West and South, and although the orders that have been placed are, with few exceptions, for the small assortments needed for present wants, still the aggregate of the goods which have changed hands is respectable, and a more hopeful feeling as regards the fall trade is apparent. No changes of importance have occurred in values, and the tone of the market is strong.

The Russell & Erwin Manufacturing Company will issue in a day or so an illustrated circular showing several new and elegant patterns of Fire Sets.

In Foreign Hardware there is little to report. It shares in the increased activity, and prices are well sustained.

The demand for Nails is more active than it was last week. The Association of Nail Manufacturers of the Atlantic States held a meeting in this city to-day. Up to the close of business their action had not transpired, but it is not believed that the existing rates will be disturbed. We quote as before, 10L to 60L, \$3-10 net, in small lots. For large orders a concession of 10 cents per keg is allowed.

The Wiebusch & Hilger Hardware Company, of this city, have been appointed agents for the Seymour Mfg. Company, of Seymour, Indiana, manufacturers of Grain Cradles, Scythe Snaths, &c. They will carry a full assortment of these goods in stock, and offer them to the trade at best factory prices. These goods are sold at the regular combination list and discounts.

Marx Brothers, No. 430 Broadway, manufacturers and proprietors of Young's Patent Folding Scissors, quote these goods, which are made in two sizes, at \$12 and \$18 per dozen respectively, subject to a discount to regular trade of 25 per cent. These goods have been greatly improved since their first introduction to the trade; the blades are manufactured from Stubbs' best tool Steel, and the bows of fine cast steel. They are nickel-plated, and each Scissors is provided with a neat leather case. These goods, we are informed, retail readily at \$1 and \$1.50 each. They are elegantly fitted and finished, and can be supplied with names handsomely etched on the blades when desired. In their advertisement on the 11th page an illustration of these goods will be found, to which we invite attention.

The manufacturers of Cordage advanced the price of Sisal half a cent per pound. The following is the revised list, issued under date of 19th inst., and which is subject to the usual trade discount:

PRICES OF CORDAGE.	
Manila Cordage, sizes above 12 th'd. and Hay Rope.....	14 cts
Manila Cordage, 12 th'd. (3½ in. diam.).....	14½
" " 6 th'd. and 9 th'd. (3 in. and 3½ in. diam.).....	15
" " Cordage, bolt rope yarns.....	15½
" " th'd.....	16½
Manila Whale Lines.....	16
Tar'd Manila.....	18½
Fine Tar'd Manila Lath Yarn.....	15

Sisal Rope, sizes above 12 th'd. & Hay Rope.....		cts.
12 th'd.....	10½	10½
6 th'd. and 9 th'd.....	11	11
Tar'd Sisal Lath Yarn.....	13	13
Fine Tar'd Sisal Lath Yarn.....	13	13
Russia Hemp Tar'd Cordage.....	12	12
American Hacked Hemp Tar'd Cordage.....	12	12
Tar'd American Lath Yarn.....	13	13
Fine Tar'd American Lath Yarn.....	13	13

We have received the following:

MILWAUKEE, Wis., Aug. 15, 1876.
We hereby give notice to our patrons and dealers in Hardware in general, that Messrs. Graham & Haines, 113 Chambers street, New York, are the agents for the sale of Kason's Patent Concavo-Convex Augers and Bits. They will carry the goods in stock, and orders sent to them will be promptly filled at factory prices.
Respectfully, &c.,
MILWAUKEE MFG. CO.,
Sole Manufacturers.

We print below the list of these goods, the regular discount from which is 40 per cent.:

Kason's Patent Concavo-Convex Twist Augers and Bits.
Millwrights' and Carpenters' Augers—Twist, 5 to 10 inches.
Inch..... ½ ¾ 1 1½ 2 2½ 3 3½ 4 4½ 5 5½ 6 6½ 7 7½ 8 8½ 9 9½ 10 10½ 11 11½ 12 12½ 13 13½ 14 14½ 15 15½ 16 16½ 17 17½ 18 18½ 19 19½ 20 20½ 21 21½ 22 22½ 23 23½ 24 24½ 25 25½ 26 26½ 27 27½ 28 28½ 29 29½ 30 30½ 31 31½ 32 32½ 33 33½ 34 34½ 35 35½ 36 36½ 37 37½ 38 38½ 39 39½ 40 40½ 41 41½ 42 42½ 43 43½ 44 44½ 45 45½ 46 46½ 47 47½ 48 48½ 49 49½ 50 50½ 51 51½ 52 52½ 53 53½ 54 54½ 55 55½ 56 56½ 57 57½ 58 58½ 59 59½ 60 60½ 61 61½ 62 62½ 63 63½ 64 64½ 65 65½ 66 66½ 67 67½ 68 68½ 69 69½ 70 70½ 71 71½ 72 72½ 73 73½ 74 74½ 75 75½ 76 76½ 77 77½ 78 78½ 79 79½ 80 80½ 81 81½ 82 82½ 83 83½ 84 84½ 85 85½ 86 86½ 87 87½ 88 88½ 89 89½ 90 90½ 91 91½ 92 92½ 93 93½ 94 94½ 95 95½ 96 96½ 97 97½ 98 98½ 99 99½ 100 100½ 101 101½ 102 102½ 103 103½ 104 104½ 105 105½ 106 106½ 107 107½ 108 108½ 109 109½ 110 110½ 111 111½ 112 112½ 113 113½ 114 114½ 115 115½ 116 116½ 117 117½ 118 118½ 119 119½ 120 120½ 121 121½ 122 122½ 123 123½ 124 124½ 125 125½ 126 126½ 127 127½ 128 128½ 129 129½ 130 130½ 131 131½ 132 132½ 133 133½ 134 134½ 135 135½ 136 136½ 137 137½ 138 138½ 139 139½ 140 140½ 141 141½ 142 142½ 143 143½ 144 144½ 145 145½ 146 146½ 147 147½ 148 148½ 149 149½ 150 150½ 151 151½ 152 152½ 153 153½ 154 154½ 155 155½ 156 156½ 157 157½ 158 158½ 159 159½ 160 160½ 161 161½ 162 162½ 163 163½ 164 164½ 165 165½ 166 166½ 167 167½ 168 168½ 169 169½ 170 170½ 171 171½ 172 172½ 173 173½ 174 174½ 175 175½ 176 176½ 177 177½ 178 178½ 179 179½ 180 180½ 181 181½ 182 182½ 183 183½ 184 184½ 185 185½ 186 186½ 187 187½ 188 188½ 189 189½ 190 190½ 191 191½ 192 192½ 193 193½ 194 194½ 195 195½ 196 196½ 197 197½ 198 198½ 199 199½ 200 200½ 201 201½ 202 202½ 203 203½ 204 204½ 205 205½ 206 206½ 207 207½ 208 208½ 209 209½ 210 210½ 211 211½ 212 212½ 213 213½ 214 214½ 215 215½ 216 216½ 217 217½ 218 218½ 219 219½ 220 220½ 221 221½ 222 222½ 223 223½ 224 224½ 225 225½ 226 226½ 227 227½ 228 228½ 229 229½ 230 230½ 231 231½ 232 232½ 233 233½ 234 234½ 235 235½ 236 236½ 237 237½ 238 238½ 239 239½ 240 240½ 241 241½ 242 242½ 243 243½ 244 244½ 245 245½ 246 246½ 247 247½ 248 248½ 249 249½ 250 250½ 251 251½ 252 252½ 253 253½ 254 254½ 255 255½ 256 256½ 257 257½ 258 258½ 259 259½ 260 260½ 261 261½ 262 262½ 263 263½ 264 264½ 265 265½ 266 266½ 267 267½ 268 268½ 269 269½ 270 270½ 271 271½ 272 272½ 273 273½ 274 274½ 275 275½ 276 276½ 277 277½ 278 278½ 279 279½ 280 280½ 281 281½ 282 282½ 283 283½ 284 284½ 285 285½ 286 286½ 287 287½ 288 288½ 289 289½ 290 290½ 291 291½ 292 292½ 293 293½ 294 294½ 295 295½ 296 296½ 297 297½ 298 298½ 299 299½ 300 300½ 301 301½ 302 302½ 303 303½ 304 304½ 305 305½ 306 306½ 307 307½ 308 308½ 309 309½ 310 310½ 311 311½ 312 312½ 313 313½ 314 314½ 315 315½ 316 316½ 317 317½ 318 318½ 319 319½ 320 320½ 321 321½ 322 322½ 323 323½ 324 324½ 325 325½ 326 326½ 327 327½ 328 328½ 329 329½ 330 330½ 331 331½ 332 332½ 333 333½ 334 334½ 335 335½ 336 336½ 337 337½ 338 338½ 339 339½ 340 340½ 341 341½ 342 342½ 343 343½ 344 344½ 345 345½ 346 346½ 347 347½ 348 348½ 349 349½ 350 350½ 351 351½ 352 352½ 353 353½ 354 354½ 355 355½ 356 356½ 357 357½ 358 358½ 359 359½ 360 360½ 361 361½ 362 362½ 363 363½ 364 364½ 365 365½ 366 366½ 367 367½ 368 368½ 369 369½ 370 370½ 371 371½ 372 372½ 373 373½ 374 374½ 375 375½ 376 376½ 377 377½ 378 378½ 379 379½ 380 380½ 381 381½ 382 382½ 383 383½ 384 384½ 385 385½ 386 386½ 387 387½ 388 388½ 389 389½ 390 390½ 391 391½ 392 392½ 393 393½ 394 394½ 395 395½ 396 396½ 397 397½ 398 398½ 399 399½ 400 400½ 401 401½ 402 402½ 403 403½ 404 404½ 405 405½ 406 406½ 407 407½ 408 408½ 409 409½ 410 410½ 411 411½ 412 412½ 413 413½ 414 414½ 415 415½ 416 416½ 417 417½ 418 418½ 419 419½ 420 420½ 421 421½ 422 422½ 423 423½ 424 424½ 425 425½ 426 426½ 427 427½ 428 428½ 429 429½ 430 430½ 431 431½ 432 432½ 433 433½ 434 434½ 435 435½ 436 436½ 437 437½ 438 438½ 439 439½ 440 440½ 441 441½ 442 442½ 443 443½ 444 444½ 445 445½ 446 446½ 447 447½ 448 448½ 449 449½ 450 450½ 451 451½ 452 452½ 453 453½ 454 454½ 455 455½ 456 456½ 457 457½ 458 458½ 459 459½ 460 460½ 461 461½ 462 462½ 463 463½ 464 464½ 465 465½ 466 466½ 467 467½ 468 468½ 469 469½ 470 470½ 471 471½ 472 472½ 473 473½ 474 474½ 475 475½ 476 476½ 477 477½ 478 478½ 479 479½ 480 480½ 481 481½ 482 482½ 483 483½ 484 484½ 485 485½ 486 486½ 487 487½ 488 488½ 489 489½ 490 490½ 491 491½ 492 492½ 493 493½ 494 494½ 495 495½ 496 496½ 497 497½ 498 498½ 499 499½ 500 500½ 501 501½ 502 502½ 503 503½ 504 504½ 505 505½ 506 506½ 507 507½ 508 508½ 509 509½ 510 510½ 511 511½ 512 512½

Copper: Delivered in Liverpool, per ton.				
	£	s.	d.	¢
Bell and Sheathing.....	84	0	0	0
The.....	75	0	0	0
Tough cake.....	75	0	0	0
Best selected.....	76	0	0	0

Another English Railway Accident.

The Manchester Examiner and Times of the 9th says: A collision took place, late on Monday night, on the Somerset and Dorset Railway, at Radstock, a station about ten miles from Bath, thirteen persons being killed and about thirty injured. A Liberal fete was held at Midford, a station midway between Bath and Radstock, and about 9 o'clock at night a train of empty carriages was dispatched from Bath to bring the Midford party back. There being no turntable at Midford, the train had to go on to Radstock, and just before reaching there an excursion train from Weymouth dashed into it. The engines were hurled from the line, three of the carriages were smashed, and from the debris twelve passengers and the guard of the up train were taken out quite dead. The number of passengers injured is about thirty.

The wreck of the carriages of both the trains was terrible. The four carriages on each side of the two engines were literally smashed to atoms. Three of them were so completely telescoped that it was impossible to distinguish them. They lay in a heap of splinters with a guard's van on top. Wedged between the two was the body of one of the guards of the train. It was 5:30 o'clock yesterday morning before the poor fellow could be extricated, and he then presented a frightfully mangled appearance. Both guards' vans were knocked to pieces, and an eyewitness of the wreck says the two trains were a heap of ruins. It is said that the train was not crowded with passengers, but one person states that he saw nine dead bodies removed to carts to be taken away. Two of them were those of children; one was that of a woman. One body had been decapitated. Fires were lighted on the line in the night with the debris of the carriages, and attendance was at hand as promptly as the circumstances would permit. Carts were in waiting to convey the injured to the Bath Infirmary.

Coal Dust for Fuel.

The value of coal dust for fuel is pretty generally admitted, and a good many experiments have been made upon methods of burning it. Definite information upon the saving effected is, however, one of the most important things needed in connection with the subject, in order to direct public attention to this method of economy. The Ocean Mill, at Newburyport, Mass., has for some time been running upon coal dust as a fuel. For years they have kept an actual account with scales of every barrow of coal wheeled into the fire room, and the average weekly consumption shows 40 tons of broken coal on 18,000 pounds of cloth average costing \$7 per ton, or \$280 per week, which makes the cost of fuel per pound of cloth over 1 1/2 cents. Under the present arrangement the weekly consumption is only 36 tons of pea and dust on 20,000 pounds of cloth, costing \$3.50 per ton, or \$126 per week, which makes the cost of fuel per pound of cloth less than six mills, showing a saving of nearly one cent per pound. This mill is run entirely by steam, and the cost of one and a half cents per pound in burning large coal does not vary from the cost of other mills in the same vicinity. Beyond the saving of fuel, the fire is much easier on the boilers, brick work and fronts of furnaces, no repairs having been made on any of the above since the arrangement was put in, and the grates are as perfect as when new. This one item almost pays the expense of the entire arrangement. The labor is not near as hard on the fireman, and the engineer has the steam under entire control. Again, if steam is drawn down rapidly, as in dye works, it can be brought up again in a quarter of the time.

Excursion of the Yale Lock Company's Operatives to Philadelphia.—The Stamford Advocate of Aug. 11th, says: "The Yale Lock Factory is to be shut down for two weeks, commencing next Monday, in order that the employees may have an opportunity to visit the Centennial at Philadelphia. Nor are they required to pay their own way, the president of the company, Henry R. Towne, Esq., has, with a generosity worthy of wide recognition and imitation, arranged for their

expenses to and from the City of Brotherly Love. The 'boys' of the 'lock shop' are certainly in luck, for such an opportunity to examine the mechanical contrivances of the world may never occur again to most of them. The company also will be indirectly benefited, as what is to be seen at the great exposition will tend to educate their employees and develop their mechanical ideas to still greater perfection. It is not surprising then to see the grateful smiles which adorn the countenance of the Yale Lock boys since their president made the announcement of his intention to pay their expenses to Philadelphia. The extent of Mr. Towne's munificence will be better appreciated when it is known that the employees will number over 100, and their fare cannot be much less than six dollars per man."

Continental Exhibitions in 1876.—The Vienna Illustrirte Generalzeitung gives the following list of current exhibitions: Agram, local agricultural, September 28th to October 8th; Alzey (Hessen), international industrial, September; Darmstadt, industrial local, middle of August; Erfurt, horticultural, September 9th to 17th; Gmunden, agricultural, September 24th and 25th; Marburg, viticulture, distilling apparatus, &c., September 20th to 23d; Misteck, agricultural, September 7th to 10th; Munich, Austro-German industrial art, June 15th to October 15th; Neutitschein, agricultural, September 3d and 4th; Nuremberg, millers' and bakers' products and machinery, August 13th to 24th; Olbersdorf (Austrian Silesia), manures and machinery, September 7th to 10th; Reichenberg, agricultural, September 10th to 12th; Rosenberg (Bohemia), agricultural, September 19th; Steyr, agricultural, September 7th to 10th; Szegedin, local industries, August 20th to September 10th; Utrecht, international universal, August 1st to September 30th; Villingen, exhibition of industries of the Black Forest, August 15th to September 20th; Vienna, corn trades, distilling, bread-making, &c., August, to last seven days.

The fair weather Friday and Saturday of last week permitted the work of laying the East River bridge cables to go on. The cables taken across on Monday were made fast at the top of the New York tower, and Saturday the loose ends were stretched from the tower to the anchorage. They were taken over the intervening buildings by a process similar to that which served to bring them from Brooklyn, with the exception of towing by the barges, of course. A hempen cable was laid from the tower over the roofs of the buildings between South and Front streets and between Front and Water streets to a drum connected with an engine at the anchorage. Men were stationed upon the roofs to guide the cables as they were drawn over by the engine. Both were successfully laid without accident, under the supervision of Mr. Farrington. This week the cables will be joined and connected with the engines which are to run them. The drums upon which the "endless chain" is to be run are already completed and waiting to be put in place. As soon as the endless chain is in working order, cables for the duplicate chain will be taken across, and then the cables for the temporary bridge. In all probability the buildings on the New York side above which the bridge is to extend will be removed for the purpose of guarding against possible damage to the bridge by fire. There are two blocks between the tower and anchorage. The buildings underneath where the bridge is to extend are mostly occupied as warehouses and factories. Mr. Farrington says that, although the question had not yet been decided, it was probable that those buildings which in case of fire would endanger the bridge would be removed.

Mr. L. J. Jennings, writing from England, says of the inconveniences of railway travel in that country: "The heat is stifling, for there is only one thin plank between you and the sun—no double roofs or even good thick ones. The roof is scarcely high enough to allow of your standing upright. Third-class carriages are like cattle pens, and I have not yet been able to muster up courage enough to travel in one, although the difference in the fare is enough to tempt anyone these hard times. For instance, the fare to a town, 156 miles from London, is, first-class, £1.13 (this is at the rate of more than five cents per mile); third-class it is 14/7, or considerably less than one-half. From London to Edinburgh the distance is 400 miles, and the fare by first-class is £3.4/6 (this is at the rate of more than four cents per mile). By third-class it is £1.2/8. But then it must be stated that third-class carriages are seldom or never attached to the fast trains. In a cheap train you crawl along at a snail's pace, and every now and then have the privilege of being 'shunted,' so that a more favorite train may pass you. On some lines even second-class carriages are excluded from the best trains. The result is, that anybody who values time is almost driven to travel by first-class, and unless he wants to see servant girls play the fine lady and have a baby howling in his ear, and a band-box or two poked upon his knee, and a child's hoop rammed into the small of his back, he will stick to that mode of conveyance, notwithstanding the hot curtains and greasy cushions."

EUREKA

Patent Coffee and Tea Urns and Pots.

The best Urns and Pots in the market. Coffee made in three minutes without boiling. Entirely free from tannic acid, saves all the aroma. Send for circular. 26 CHAMBERS STREET, N. Y.

For Sale at all house furnishing stores.

Troy Polishing Works.

STOVE ORNAMENTS

A Specialty.

No. 641 River Street, TROY, N. Y.

THOS. A. ELGIE, Agent.

C. SCOFIELD'S STRAIGHTENER OR BENDER,

For Shafting, Axles, Tubes, Rails, &c.

There has long been a want of some device by which the straightening of shafting could be done without removing the work from the centers, and at the same time do it quickly and accurately. The

SCOFIELD PATENT SHAFT STRAIGHTENER

meets just such a want; the apparatus is light and can be easily handled, yet it is of sufficient strength for the purpose required. It can be placed upon the shears of the lathe, and moved along the entire length of the work. It is especially

Adapted to Removing Short Bends,

which frequently occur in long lengths of shafting. The lightness of the Straightener renders it eminently

Adapted for Line and Counter-Shafting, without necessitating the time and trouble of removing hangers and detaching couplings, but can be

Easily applied to the Shaft while in Position.

It can also be used on the bench for short lengths.

For Circulars, Price List, &c., Address,

C. SCOFIELD & CO.,

Vineland, N. J.



RHODE ISLAND HORSE SHOE CO.,

OFFICE, 81 Canal Street, Providence, R. I. WORKS at Valley Falls, R. I.

Manufacturers of

PERKINS and RHODE ISLAND PATTERNS of

HORSE AND MULE SHOES.

NEW & NOVEL,

And of

RARE Practical Merit.

Made of BEST TOOL STEEL,

FORGED SOLID FROM THE BAR.

Is having a Large Sale. Sells readily to

Steam and Gas Fitters

and Plumbers.

Also to MACHINISTS AS A UNIVERSAL WRENCH.

Send for Descriptive Circular and Price List. Very liberal terms to the trade.

—

Sold in New York City by

McNab & Harlin Mfg. Co., 56 John St.

Morris, Tasker & Co., 15 Gold St.

Nason Mfg. Co., 61 Beekman St.

W. C. Duyckink, 80 John St.

In Boston by

Walworth Mfg. Co., 69 Kilby St.

Morris, Tasker & Co., 38 Oliver St.

May & Co., 50 Oliver St.

A. J. Wilkinson & Co., 48 Washington St.

Goodnow & Wightman, 23 Cornhill St.

London, England.

Jno. G. Rollins & Co., Old Swan Wharf.

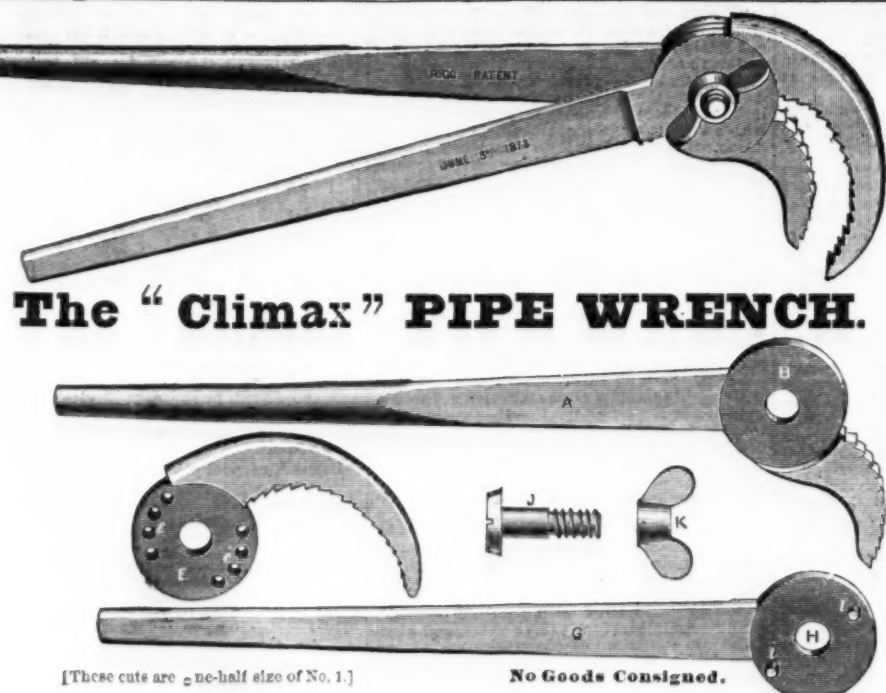
C. Churchill & Co., 28 Wilson St., Finsbury.

Bremen.—Ang. Eggert.

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Manufacturers,

Danbury, Conn.

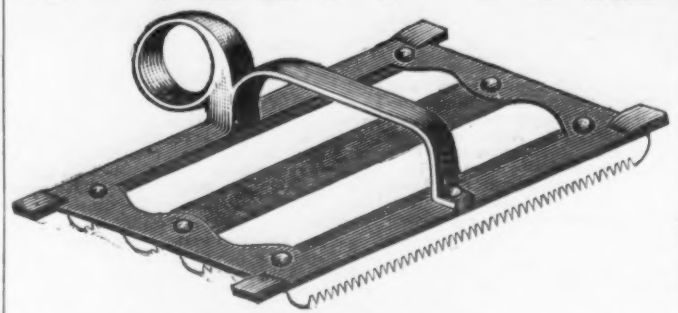


The "Climax" PIPE WRENCH.

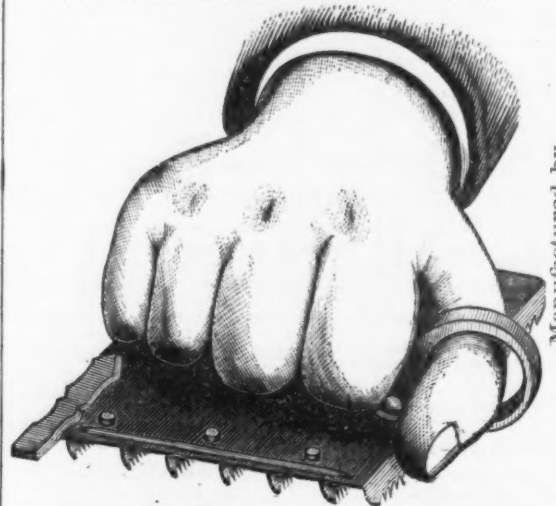
[These cuts are a half-size of No. 1.]

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THIS CUT ILLUSTRATES THE GRASPING OF THE COMB.



Manufactured by
HOTCHKISS' SONS,
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These Combs do not infringe upon the rights of any one. They are the simplest, Neatest and Most Durable CURRY COMBS ever offered to the trade, affording an easy grasp for the hand, without the use of the ordinary side handle, and are universally acknowledged to be superior to all others. They are neatly put up in paper boxes of one dozen each, and packed 24 dozen in a case. Special net prices furnished on application.

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It has Won the Praise of Thousands.



Patented August 18, 1874.

The above cut shows the shape and design of the COTTAGE FLY TRAP. It is JAPANESE dark red color, with bronzed border, the ends neatly lettered and ornamented. It has a NEAT AND ATTRACTIVE APPEARANCE, and does not look out of place in the dining room or parlor. The experience of last year warrants us in fully recommending it as THE BEST FLY TRAP IN THE MARKET. It surpasses all others in CATCHING FLIES, its capacity for doing so being FOUR TO SIX TIMES GREATER than the so-called "Cone Traps." It is compact, and its construction is so simple that a child can bait and manage it. Its price is low as compared with all others. A trial will convince any one that it has no superior. PUT UP IN BOXES OF ONE DOZEN EACH.

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The wheel is acted upon directly by the rail. The hub of this wheel revolves within chilled iron rollers. The difference between the diameter of the wheel and the diameter of the hub gives the leverage gained. The hanger has the advantage of this leverage in addition to that obtained from the use of anti-friction roller bearings, and in this respect, as well as in others apparent on examination, is superior to any yet offered to the trade. It requires no oiling.

IT COMBINES SIMPLICITY, EASE OF ACTION, STRENGTH, DURABILITY, BEAUTY OF DESIGN.

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Manufactured by

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Worcester, Mass.

We invite the particular attention of the trade to our New Straight Bar Wrench, widened, full size of the larger part of the so called "reinforced or jog bar." Also our enlarged jaw, made with ribs on the inside, having a full bearing on the front of bar (see sectional view), making the jaw fully equal to any strain the bar may be subjected to.

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We would also call attention to the fact, that in 1869 we made several important improvements (secured by patents), on the old wrench previously manufactured by L. & A. G. Coes which were at once closely imitated and sold as the Genuine Wrench by certain parties who seem to rely upon our improvements to keep up their reputation as manufacturers, and although the fact of their imitating our goods may be good evidence that we manufacture a superior Wrench, we wish the trade may not be deceived on the question of originality. Trusting the trade will fully appreciate our recent efforts, both in improvements on the Wrench and in the adoption of a Trade Mark, we would caution them against imitations. None genuine unless stamped

"L. COES & CO."

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PATENTED JULY 25, 1871.

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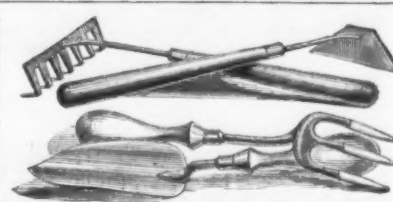
In this Strap the liability of the leather to stretch and become loose and porous is prevented by the use of a patented non-extensible base, which supports the leather and secures

PERMANENT ELASTICITY.

We make this style with single rod, double rod, and wood frames, and intend that it shall, in quality compare favorably with our other well known brands.

BENJAMIN F. BADGER & SON, Manufacturer

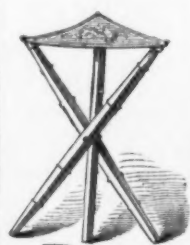
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This set of GARDEN TOOLS, is put up in a nice paper box, and is superior to any other in the market. The tools are made of the best quality of Steel, highly polished, and of malleable iron polished or painted, with birch handles. We will make it an object for every dealer to handle them.

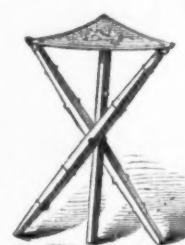
PRICE \$15, PER DOZEN SETS.

CENTENNIAL CHAIR.



This Chair is made of the best second growth White Ash, finished on the wood, with Brussels Carpet Seat. It shuts up to the size of a single chair post, and weighs only one pound. Every person who forgets to take one with him when he goes to the Centennial, will be sorry when he gets there, as no chairs are provided for visitors, and they get very tired. Every store in the land can sell a few of them at a profit. They are a very popular article here.

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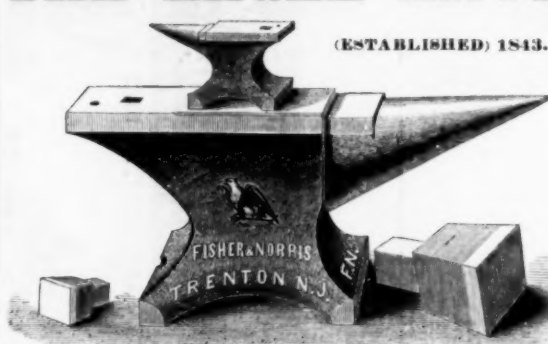


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THE EAGLE ANVIL

!! WARRANTED !!



These Anvils are superior to the best English, or other Anvils, on account of the peculiar process of their manufacture (invented and used only by this concern), and from the quality of the materials employed.

The best English Anvil becomes hollowing on the face by continued hammering in use, on account of the fibrous nature of the wrought iron—causing it to "settle" under the face.

The body of the Eagle Anvil is of crystallized iron, and no settling can ever occur; the steel face, therefore, remains perfectly true. Also, it has the great advantage that being of a more solid material, and consequently with less rebound, the piece forged receives the full effect of the hammer, instead of a part of it being wasted by the rebound, as of a wrought iron anvil. An equal amount of work can, therefore, be done on this Anvil with a hammer one-fifth lighter than that required when using a wrought iron anvil.

The working surface is in one piece of JESUP'S BEST TOOL CAST STEEL, which, being accurately ground, is hardened and given the proper temper for the heaviest work. The horn is covered with and its extremity made entirely of steel. The body of the Anvil is of the strongest grade of American iron, to which the cast steel face is thoroughly welded and not to come off.

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Small Anvils, ("Minors.")	No. 00	10 lb.	15 lb.	20 lb.	30 lb.	40 lb.	50 lb.	60 lb.	70 lb.	80 lb.	90 lb.
Weighting about	\$2.50	\$3.20	\$3.75	\$4.50	\$5.00	\$5.50	\$6.25	\$7.25	\$8.10	\$9.00	\$9.50

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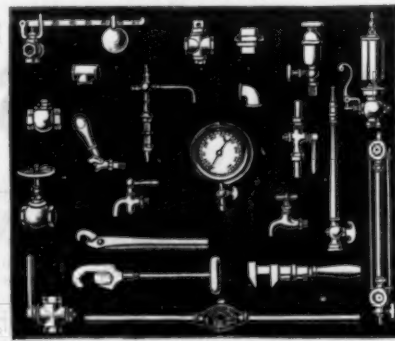
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RADIATORS

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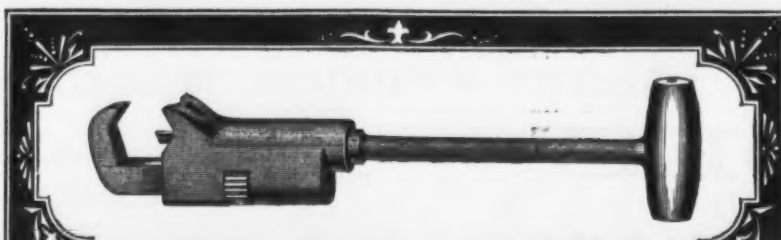
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Cuts Wrought Iron, Brass and Copper Pipes, Round Iron &c perfectly true without leaving burr on pipe, contracting or splitting it. Cuts out a chip similar to a lathe tool. The knife may be removed and ground. Send for descriptive circular to manufacturers.

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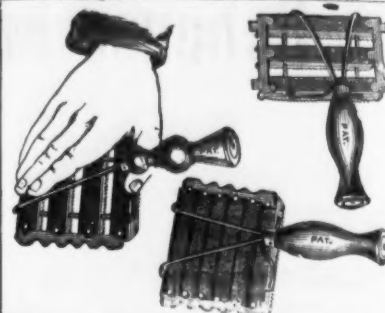
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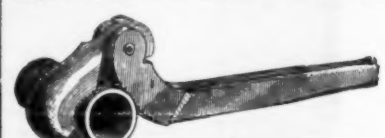
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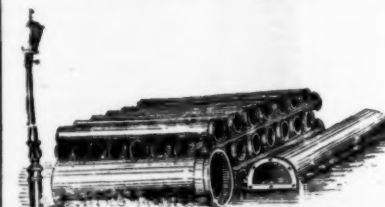
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Hutchinson John, Bridgeport, Conn.	20
Lawrence Curry Comb Co., 82 3d Avenue, N. Y.	22
Cutlery, Importers of.	
Baker Hermann & Co., 101 Duane, N. Y.	29
Clatworthy F. & Co., 100 N. Y.	11
Lecher Jos. S., 411 Commerce, Phila.	11
Friedman & Lauterbach, 14 Warren, N. Y.	11
King, Bruce & Co., 120 N. Y.	11
Marx Emanuel, 106 Chambers, N. Y.	11
Rogers & Bro., 215 Broadway, N. Y.	11
Ward Ashtin, 101 Duane, N. Y.	11
Wilson Hawkworth, 111 Duane, N. Y.	11
Cutlery, Manufacturers of.	
Bartholomew & Sons, 100 N. Y.	11
Lamson & Goodson Mfg. Co., 55 Chambers, N. Y.	11
Miller Iron, Cutlery Co., W. Meriden, Conn.	11
Newcomb Bros., 386 Water, N. Y.	11
New York Knife Co., Walden, N. Y.	11
Dear Alarm, Makers of.	
F. Blakemore & Co., Philadelphia, Pa.	10
Dear and Gate Springs.	
Quackenbush, Townsend & Co., 50 Reade, N. Y.	30
Van Wagoner & Co., 100 N. Y.	30
Dear K. Mfg. Co., Makers of.	
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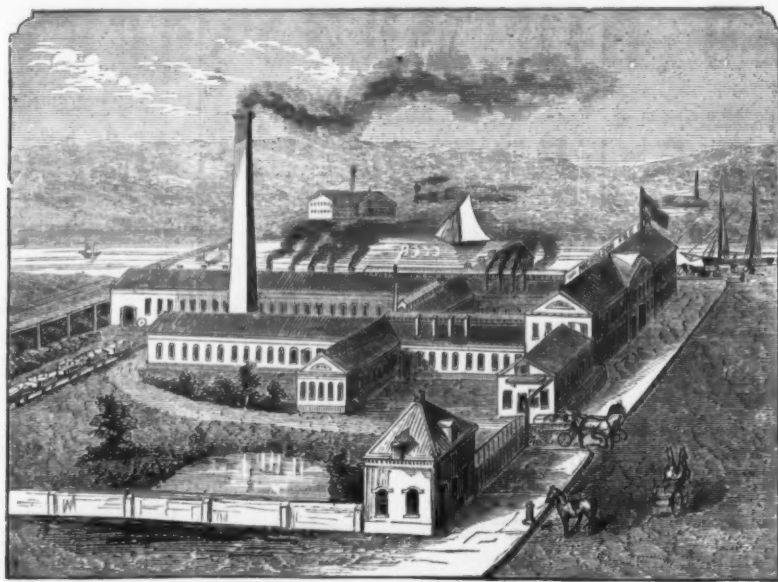


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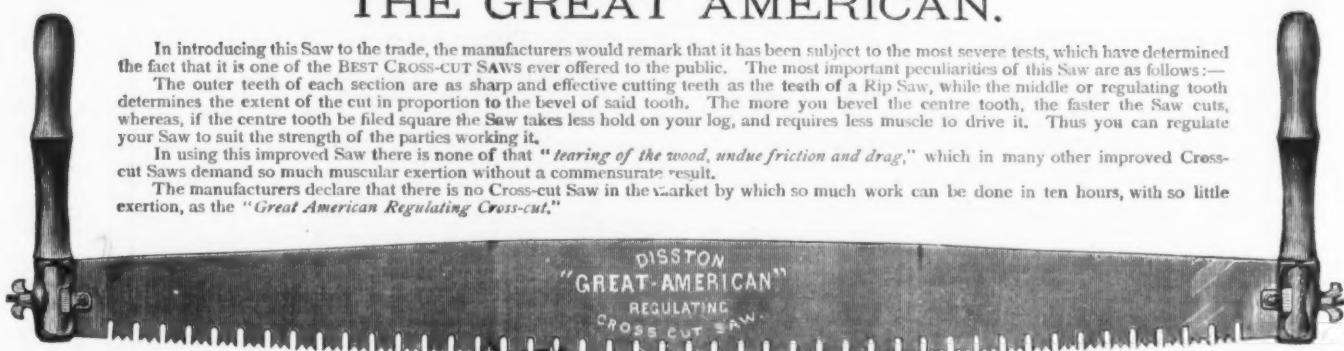
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Front and Laurel Streets, Philadelphia.

HENRY DISSTON & SONS, Hand, Panel and Rip Saws and Handled Saws OF EVERY DESCRIPTION.

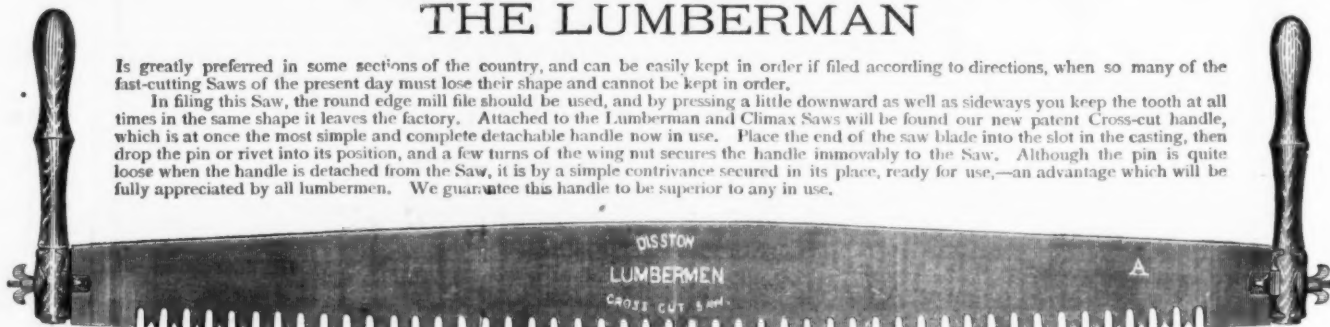
THE GREAT AMERICAN.

In introducing this Saw to the trade, the manufacturers would remark that it has been subject to the most severe tests, which have determined the fact that it is one of the BEST CROSS-CUT SAWS ever offered to the public. The most important peculiarities of this Saw are as follows:—
The outer teeth of each section are as sharp and effective cutting teeth as the teeth of a Rip Saw, while the middle or regulating tooth determines the extent of the cut in proportion to the level of said tooth. The more you bevel the centre tooth, the faster the Saw cuts, whereas, if the centre tooth be filed square the Saw takes less hold on your log, and requires less muscle to drive it. Thus you can regulate your Saw to suit the strength of the parties working it.
In using this improved Saw there is none of that "fearing of the wood, undue friction and drag," which in many other improved Cross-cut Saws demand so much muscular exertion without a commensurate result.
The manufacturers declare that there is no Cross-cut Saw in the market by which so much work can be done in ten hours, with so little exertion, as the "Great American Regulating Cross-cut."



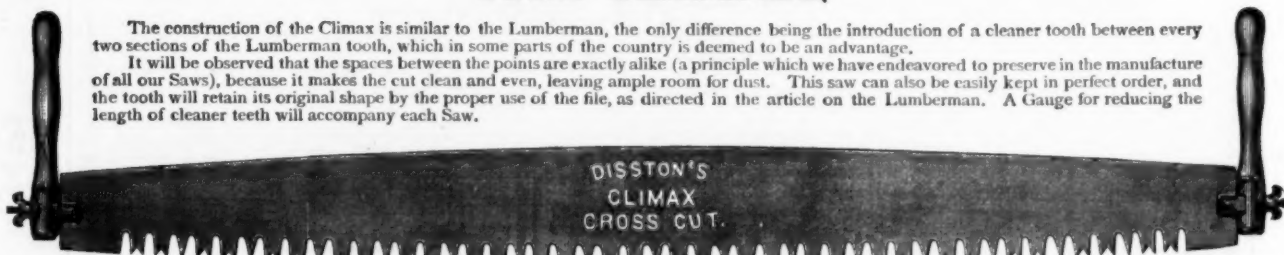
THE LUMBERMAN

Is greatly preferred in some sections of the country, and can be easily kept in order if filed according to directions, when so many of the fast-cutting Saws of the present day must lose their shape and cannot be kept in order.
In filing this Saw, the round edge mill file should be used, and by pressing a little downward as well as sideways you keep the tooth at all times in the same shape it leaves the factory. Attached to the Lumberman and Climax Saws will be found our new patent Cross-cut handle, which is at once the most simple and complete detachable handle now in use. Place the end of the saw blade into the slot in the casting, then drop the pin or rivet into its position, and a few turns of the wing nut secures the handle immovably to the Saw. Although the pin is quite loose when the handle is detached from the Saw, it is by a simple contrivance secured in its place, ready for use,—an advantage which will be fully appreciated by all lumbermen. We guarantee this handle to be superior to any in use.



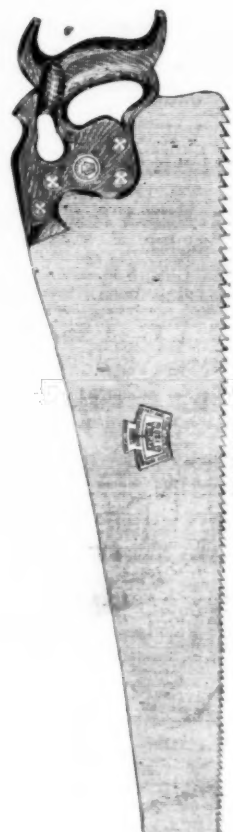
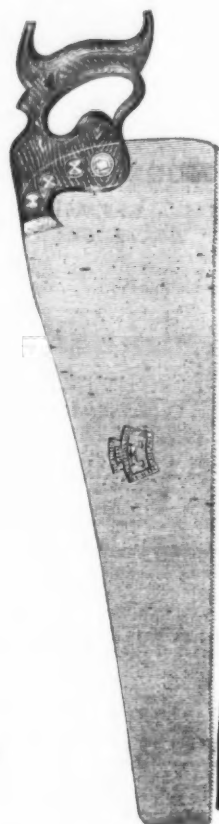
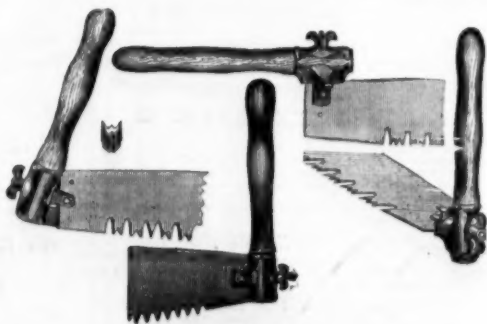
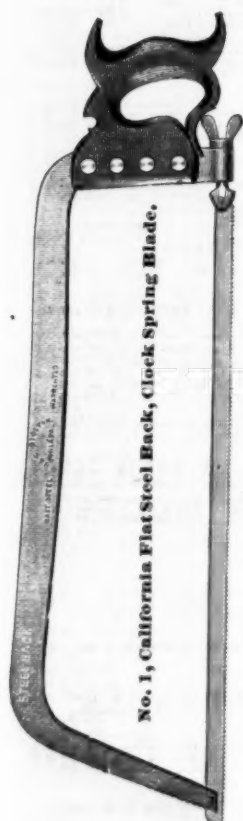
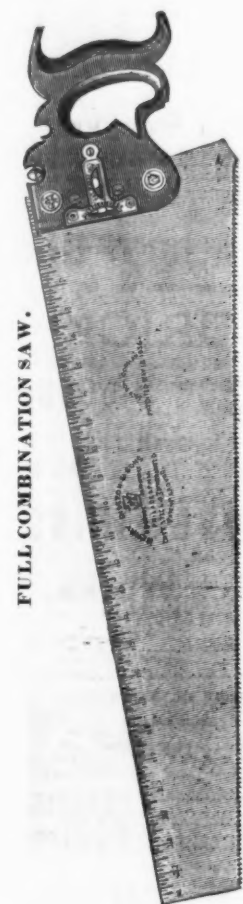
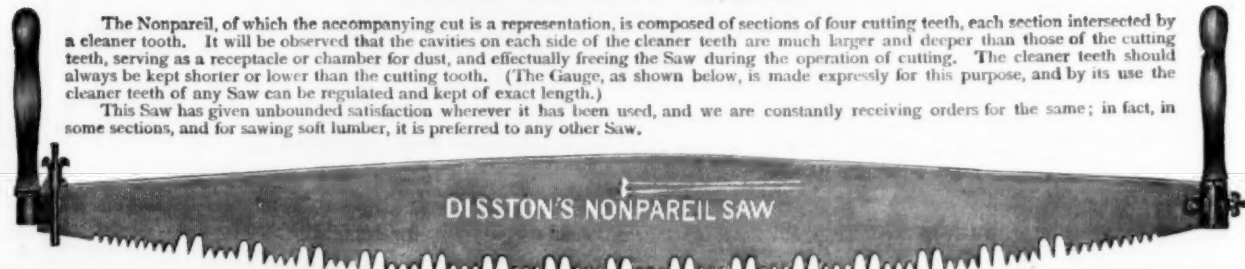
THE CLIMAX.

The construction of the Climax is similar to the Lumberman, the only difference being the introduction of a cleaner tooth between every two sections of the Lumberman tooth, which in some parts of the country is deemed to be an advantage.
It will be observed that the spaces between the points are exactly alike (a principle which we have endeavored to preserve in the manufacture of all our Saws), because it makes the cut clean and even, leaving ample room for dust. This saw can also be easily kept in perfect order, and the tooth will retain its original shape by the proper use of the file, as directed in the article on the Lumberman. A Gauge for reducing the length of cleaner teeth will accompany each Saw.



THE NONPAREIL.

The Nonpareil, of which the accompanying cut is a representation, is composed of sections of four cutting teeth, each section intersected by a cleaner tooth. It will be observed that the cavities on each side of the cleaner teeth are much larger and deeper than those of the cutting teeth, serving as a receptacle or chamber for dust, and effectually freeing the Saw during the operation of cutting. The cleaner teeth should always be kept shorter or lower than the cutting tooth. (The Gauge, as shown below, is made expressly for this purpose, and by its use the cleaner teeth of any Saw can be regulated and kept of exact length.)
This Saw has given unbounded satisfaction wherever it has been used, and we are constantly receiving orders for the same; in fact, in some sections, and for sawing soft lumber, it is preferred to any other Saw.



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ACME No. 130.

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Amber. 25
Shellac, English. 50
Dark. 50
Putty in bladders. 36
Pumice Stone, selected Lump. 44
Powdered. 44
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Rotten Stone, soft, English. 80
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FRENCH WINDOW GLASS.
Prices current per box of 50 feet.

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SIZES.	1st. 2d. 3d. 4th.
6 x 8 to 10 x 15.	\$ 7.50 \$ 6.75 \$ 6.25 \$ 5.75
11 x 14 to 16 x 24.	8.50 7.75 7.25 6.75
15 x 22 to 20 x 30.	10.75 9.75 8.75 7.94
15 x 36 to 24 x 30.	12.25 10.75 9.00 7.75
25 x 28 to 24 x 36.	13.00 11.50 9.75 8.50
25 x 36 to 26 x 44.	14.50 13.25 10.75 9.50
30 x 36 to 30 x 50.	15.00 14.00 12.00 10.75
30 x 57 to 30 x 54.	16.00 14.50 12.50 11.00
30 x 57 to 34 x 6.	17.25 15.50 13.00 11.50
34 x 38 to 34 x 60.	18.25 17.25 15.00 13.50
36 x 10 to 40 x 60.	20.75 18.75 17.25

Double Thick.

SIZES.	1st. 2d. 3d. 4th.
6 x 8 to 10 x 15.	\$12.00 \$11.00 \$10.00 \$ 9.25
11 x 14 to 16 x 24.	13.75 12.50 11.75 10.50
15 x 22 to 20 x 30.	17.25 15.75 14.50 13.00
15 x 36 to 24 x 30.	19.75 17.25 14.50 13.00
25 x 28 to 24 x 36.	21.00 18.50 15.75 13.50
25 x 36 to 26 x 44.	22.25 21.25 17.25 15.00
30 x 36 to 30 x 50.	24.00 22.50 19.00 17.00
30 x 57 to 30 x 54.	25.75 23.45 19.25 17.00
30 x 57 to 34 x 6.	27.75 25.00 21.75 19.00
34 x 38 to 34 x 60.	29.25 27.75 24.00 21.50
36 x 10 to 40 x 60.	33.25 30.00 27.75

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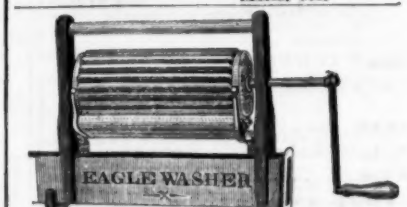
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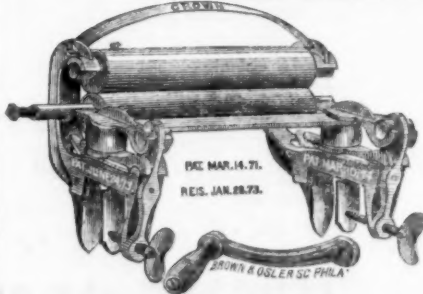
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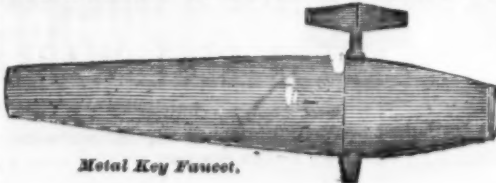
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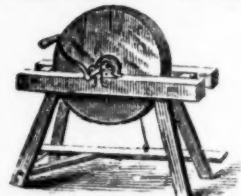
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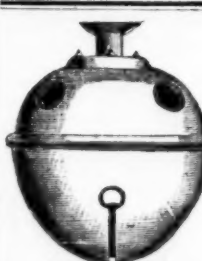
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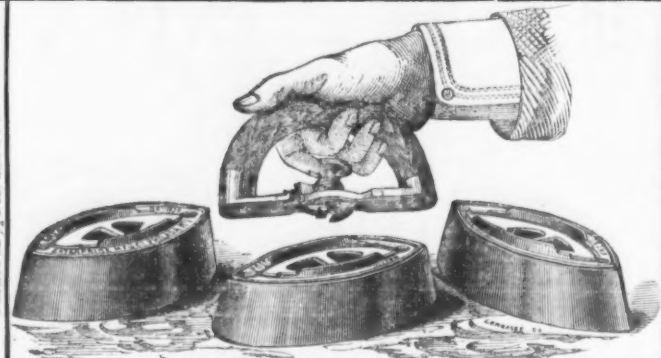
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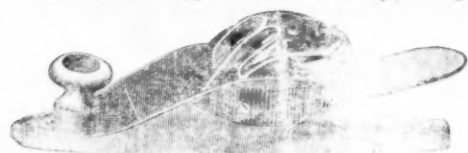
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TRIMMINGS, CARRIAGE,
And GENERAL HARDWARE

The attention of our old Customers and the Trade generally is invited to our new Illustrated Catalogue just issued, comprising a full assortment of our well known staple goods: Butts (Drilled and Wire Jointed), Thumb Latches, Sash, Upright Screw and Side Pulleys, Wardrobe and Harness Hooks, Draw Pulls, Nut Crackers, Cork Screws, &c., &c. Also several new and attractive styles of Fancy Hardware, at prices to suit the times.

Our new Patent Fancy Open Work Cap Butt, with Ornamented Knuckle, in Real and Imitation Bronze, and our Nickel Plated Cap Butts, with concealed Screws, are the handsomest in the market, and are attracting much attention. While making plain and japanned goods a specialty, we are prepared to meet the increasing demand for ornamented bronze and nickel plated House Trimmings. Goods packed in boxes or bundles, as may be preferred. For catalogue and price list address

BLAKE BROTHERS HARDWARE CO.,
New Haven, Conn.**IRON BLOCK PLANE.**

No. 110. 71-2 Inches Long, 1 3/4 Inch Cutter, \$9.00 per dozen.

STANLEY RULE AND LEVEL COMPANY, Manufacturers,
Factories, New Britain, Conn. Warerooms, 35 Chambers St., N. Y.**COBB & DREW,**
Plymouth, Mass.

Manufacturers of Copper, Brass, and Iron Rivets: Common and Swedes Iron, Leathered, Carpet, Lace and Glass Tacks: Finishing Hanger, Trunk Clout and Glass Box Nails, &c. Rivets made to Order.

NEW YORK AGENCY

Grundy & Kenworthy
HARDWARE.

165 Greenwich Street.

Agent for the Philadelphia Star Carriage and Tire Bolts

Established in 1836.

Shelton Company,
Manufacturers of every variety of
TACKS & SMALL NAILS,Carriage, Machine, Plow, Stove and
Tire Bolts, Coach Screws,
Bed Screws, &c.
BIRMINGHAM, CONN.A.G. COES
PAT. DEC. 26, 1871.

Established in 1839.

A. G. COES & CO.

WORCESTER,

Mass.,

Manufacturers of

THE GENUINE

COES'

SCREW WRENCHES.

Our goods have been very much improved recently, by making the Bar WIDE, as shown in the cut, which makes a 12 in. Wrench as strong as a 15 in. made in the ordinary way, and by using

A. G. COES'

NEW PATENT

FERRULEWhich cannot be forced back into the handle.
Our goods are manufactured under Patents dated February 7, 1860, (re-issued June 29, 1871), May 2, 1871, and Dec. 26, 1871, and any violation of either will be vigorously prosecuted.

We call particular attention to our new Patent Ferrule, with its Supporting Nut (shown in section in the above cut), which makes the strongest Ferrule fastening known.

A. G. COES & CO.



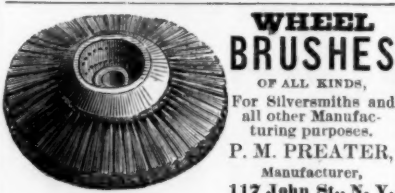
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BENCH HOOK

TUCKER & DORSEY

MANUFACTURERS,

INDIANAPOLIS, IND.



WHEEL

BRUSHES

OF ALL KINDS,

For Silversmiths and all other Manufacturing purposes.

P. M. PREATER,

Manufacturer,

117 John St., N. Y.

H. CARTER

290 Pearl Street, New York.

**Potter's Patent**
STEP LADDERS.Manufacturers of and Dealer in all descriptions of
Moulders' and Plasterers' Tools,And Dealers in
General Hardware, Gilded Copper Weather Vanes,
CARTER'S PATENT CARRIAGE LIFTING JACK, &c.**Hart, Bliven & Mead**
THE
MFG. CO.
18 & 20 Cliff and 243 & 245 Pearl Streets, New York.
Factories at KENSINGTON, CONN.
THE COMBINED NAIL DRAWER AND BOX
OPENER.
The Best and Cheapest Patent Nail Puller made
SEND FOR CIRCULAR.
Our Catalogue and "1876 Centennial Appen-
dix" is now ready for distribution
to patrons.**Lloyd, Supplee & Walton,**
HARDWARE FACTORS.

MANUFACTURERS OF

Bonney's Hollow

AUGERS.

Stearn's Hollow Augers

and Saw Vises

Bonney's Spoke Trimmers

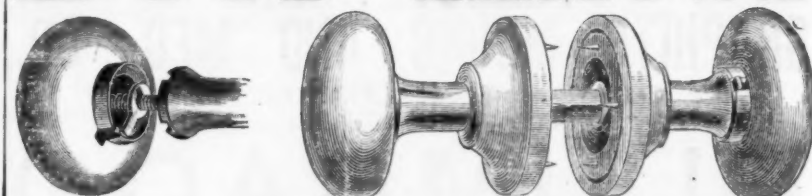
Double Edge Sook Shaves

Adjustable Gate Hinges

Scandinavian Pad Locks

Flat Key Brass and Iron Pad Locks, &c., &c.

625 Market St., Phila., Pa.

**WHIPPLE'S PATENT**
Door Knobs**THE WHIPPLE DOOR KNOB**

Is the only perfect Door Knob Attachment ever invented.

AWARDED A BRONZE MEDAL

At the American Institute Fair, in New York, for 1874.

NO SCREWS USED IN NECK OR ROSES.

Adjusts Perfectly to Doors of Different Thicknesses

WITHOUT THE USE OF RINGS.

The attention of Architects, Builders and Carpenters is specially desired. Circulars fully describing the advantages of this Knob, with Price List, sent on application to

The Parker & Whipple Co.,

WEST MERIDEN, CONN.,

Or 97 CHAMBERS STREET, NEW YORK.

WILSON MANUFACTURING COMPANY.,
NEW LONDON, CONN.

MANUFACTURERS OF

SOLID BOX VISES.

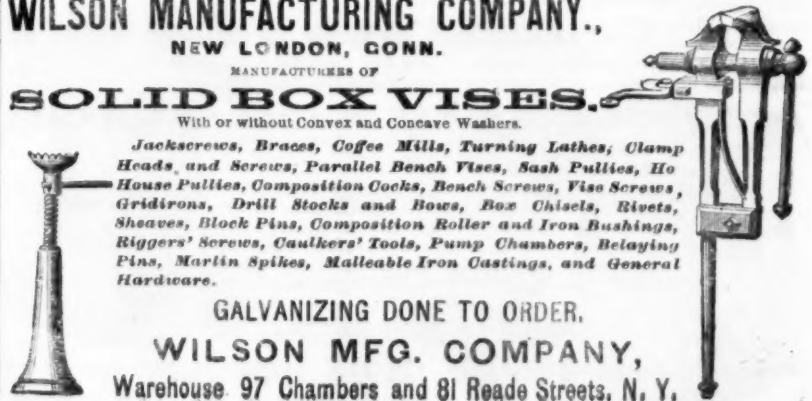
With or without Convex and Concave Washers.

Jackscrews, Braces, Coffee Mills, Turning Lathes, Clamp Heads, and Screws, Parallel Bench Vises, Sash Pullies, Ho House Pullies, Composition Cocks, Bench Screws, Vise Screws, Gridirons, Drill Stocks and Bows, Box Chisels, Rivets, Sheaves, Block Pins, Composition Roller and Iron Bushings, Riggers' Screws, Caulkers' Tools, Pump Chambers, Belaying Pins, Martin Spikes, Malleable Iron Castings, and General Hardware.

GALVANIZING DONE TO ORDER.

WILSON MFG. COMPANY,

Warehouse 97 Chambers and 81 Reade Streets, N. Y.



THE GARLAND.

The Prince of all Base Burners.

Four Sizes, - - Nos. 25, 30, 40 and 50.

Two Sizes with Ovens, Nos. 30 and 40.

THE CENTENNIAL YEAR
ITS FIRST APPEARANCE.

All New Patterns made at our own Works.

It has many Essential Features entirely different from anything in the Market. Its general appearance is very attractive; its beauty of ornamentation is unequalled; its working-qualities perfect; beside, its smoothness of castings, perfect fittings, burnished edges, full nickel-plated trimmings places it at the head of them all.

All doors swing out on a hinge, can be easily taken off to facilitate in blacking and cleaning the micas, and are provided with a portable, nickel-plated Turnbuckle, a new feature originating with us, as well, also, as the Urn Ornamental Top, which we claim Letters Patent on. Nickel-plated Plate ornaments the base of the Stove. Handle to dampers, number plate and even the heads of the rivets are all nickel-plated. The trade should not delay sending for a sample stove to insure their taking the lead in their respective localities.

WE ALSO MANUFACTURE A FULL LINE OF

Cooking, Parlor and Heating Stoves,

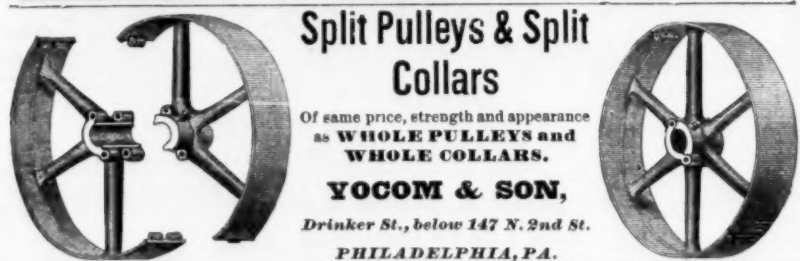
unsurpassed by any in the market, as we use nothing but the best of Lake Superior Charcoal and other First Class Brands of Iron.

Send for Catalogue and Price Lists.

N. B.—To the Eastern Dealer we can arrange freight charges satisfactorily.

MICHIGAN STOVE CO.,

Detroit, Mich.



Split Pulleys & Split Collars

Of same price, strength and appearance as WHOLE PULLEYS and WHOLE COLLARS.

YOCOM & SON,

Drinker St., below 147 N. 2nd St.

PHILADELPHIA, PA.



The National Steel Tube Cleaner.

Patented July 28, 1874.

Guaranteed to clean better, last longer and work easier than any in the market. Removes all Carbon and Scale on the Boiler Tubes. Adopted and in use by United States Navy. For sale by dealers.

THE CHALMERS SPENCE CO., Foot East 9th St., N. Y., Agents for the United States.



HAMMER & CO.,

Branford, Conn.,

Manufacturers of the following Patented Articles of

MALLEABLE IRON:

Hammer's Adjustable Clamps.

Hammer's Malleable Iron Oilers.

Hammer's Mail, Iron Hand Lamps.

Hammer's M. I. Hanging Lamps.

For Sale by all the principal Hardware Dealers.

Malleable Iron Castings

Of superior Quality and Hardware Specialties in Malleable Iron made to order.

THE "DUCKHAM" PATENT
Suspended Self-Indicating
WEIGHING MACHINE.
Capacities from 1 to 100 tons.



ROBERT KING,
MANUFACTURER,

Hydraulic Presses, Accumulators, &c.

246 to 250 Plymouth St., Brooklyn, N. Y.

**JOHNSON'S PATENT UNIVERSAL
LATHE CHUCK.**



We invite attention to the superior construction of this chuck. Its working parts are absolutely protected from dirt and chips. It is strong, compact and durable, and will hold the greatest variety of work, as the jaws are adjustable with a range the full diameter of the chuck. For Price List address.

Lambertville Iron Works, Lambertville, N. J.

RIEHL BROTHERS,
Cmce and Works, N. 9th St., above Master, Phila.
Warehouses, 50 & 52 N. 4th St., above Chestnut, Phila.
New York Store, 30 Liberty Street.
Pittsburgh Store, 43 Smithfield Street.

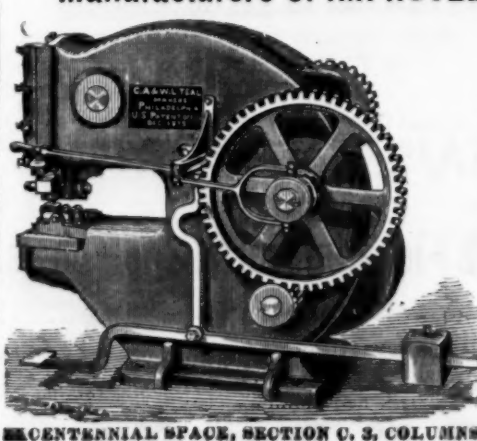
SCALES
SCALE
AND
TESTING
WORKS
PHILADELPHIA
ESTABLISHED 1836

"Patented" Furnace Charging Scale.
Double Beam R. R. Truck Scale, Compound Parallel Crane Beams, &c. Patented First Power Lever Wagon Scales, Testing Machines and capacity.
Send for Illustrated Price List.



BLISS & WILLIAMS,
Manufacturers of all kinds of
PRESSES, DIES, & SPECIAL MACHINES,
FOR WORKING SHEET METALS, &c.
167 to 173 Plymouth Street, Cor. of Jav, Brooklyn, N. Y.

C. A. & W. L. TEAL,
Manufacturers of IMPROVED BENDING ROLLS



Arranged for
Removing Work from the end of top roll.

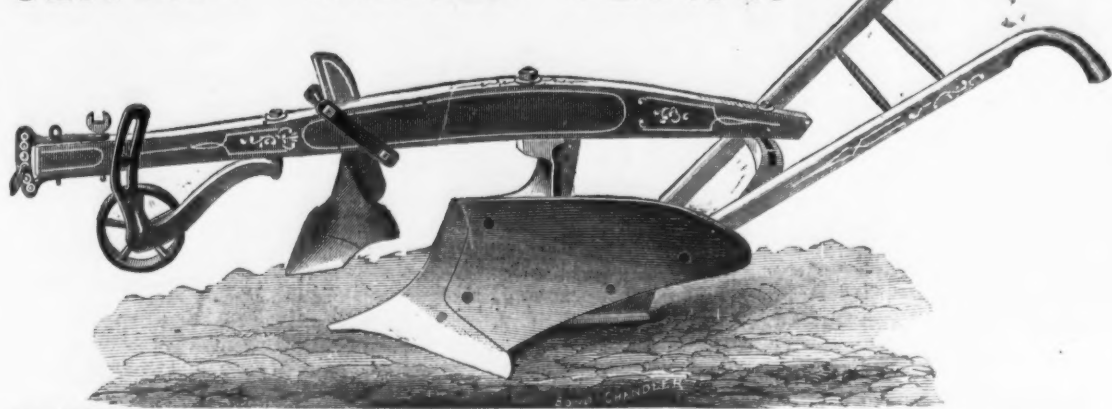
COMBINED
Punching and Shearing
Machines, Single Power Punching
Machines with Shearing Attachments,
Rotary Shearing Machines, Steam Riveting
Machines, "Atherton's" Patent
"Cam," Steam Engines, Half
Picking Machines and
MACHINERY
in general.

We would call special attention to the above engine, as it has the same leverage on the driving shaft at every point of the stroke that the "crank" has at its strongest point, making a smoother running as well as a more powerful engine.

4116 Ludlow St., Philadelphia.

CENTENNIAL SPACE, SECTION C. 3, COLUMNS 25 & 26, MACHINERY HALL.

OLIVER'S CHILLED PLOWS.



These implements, though but four years before the public in their present form, show the following remarkable record:
1506 were sold in the season of 1871. 7472 were sold in the season of 1873. 31,077 were sold in the season of 1875.
3049 1872. 14,976 1874. 42,139 having been sold the past spring.
The sales for 1876, will undoubtedly exceed 60,000 Plows. For full descriptive circulars, address,

SOUTH BEND IRON WORKS, South Bend, Ind.

IMPROVED DERINGER REVOLVERS.

No. 1, 22 Calibre; No. 2, 32 Calibre, Long Cartridge.



Cut Represents No. 2, 32 Calibre, 5 Shot. Size reduced one-third.
Exact Model of S. & W. No. 1 and No. 1-2 Revolvers.
These Arms are Half Nickel Plated and are equal in style of finish to the best Arms in the country. Quality of workmanship and material first-class; warranted. Price less than any other Hinge Barrel Cartridge Revolver of same quality in the market.

SOLE AGENTS:

EDW. K. TRYON, Jr. & Co., Dealers in FIRE ARMS,

No. 19 North Sixth Street and 220 North Second Street, PHILADELPHIA, PA.

THE VICTOR PLANES

Are the most simple, compact and practical Adjustable Planes ever offered to the public. They are made under the personal supervision of Mr. L. BAILEY, the original inventor of L. BAILEY'S PATENT ADJUSTABLE IRON PLANES. All our Planes have our Trade Mark. Send for Catalogue, embracing Planes, Try Squares, Bevels, Rules, Levels, Hammers, Mitre Boxes, etc., etc.

THE BILLINGS & SPENCER CO., HARTFORD, CONN.

MANUFACTURERS OF

Die Plates and Dies, Genuine Packer Ratchet Drills, Clamp, Die and Common Lathe Dogs, Barwick Wrench and Pipe Tongs, the Billings Patent Sewing Machine Shuttles, Marlin Spikes, Calkers' Tools, Clinch Rings, Saw Sets, Screw Drivers, And all description of IRON AND STEEL

Drop Forgings.

Send for a Circular.



Ausable Horse Nail Co., HAMMERED, HAMMER POINTED, POLISHED & BLUED HORSE NAILS,

FROM BENZON IRON.

Orders promptly filled at lowest market rates.

ABRAHAM BUSSING, Secretary, 35 Chambers Street, New York.

GLOBE NAIL COMPANY,

MANUFACTURERS OF

Pointed, Polished & Finished Horse Shoe Nails.

Recommended by over 20,000 Horse Shoers.

All nails made from best NORWAY IRON, and warranted perfect and ready for driving. Orders filled promptly and at lowest rates by

GLOBE NAIL CO., Boston, Mass.

Solder, F. S. & Co.'s make	10c
Best Fine	10c
No. 1	10c
Roofing	10c
Braziers or Solder	10c
Antimony	10c
Habit Metal—F. S. & Co.'s	10c
No. 2	10c
Sheet Iron—	
No. 24	Common
No. 26	Common
No. 28	Common
No. 30	Common
No. 32	Common
No. 34	Common
No. 36	Common
No. 38	Common
No. 40	Common
No. 42	Common
No. 44	Common
No. 46	Common
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No. 50	Common
No. 52	Common
No. 54	Common
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No. 96	Common
No. 98	Common
No. 100	Common

Galvanized Iron—	
No. 10 to 20	10c
No. 21 to 24	10c
No. 25 to 28	10c
No. 29 to 32	10c
No. 33 to 36	10c
No. 37 to 40	10c
No. 41 to 44	10c
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No. 93 to 96	10c
No. 97 to 100	10c

Russia Iron—	
No. 1 Stained	10c
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No. 20	10c



TO ALL WHO USE STEAM-POWER!

We will put our Governor on any Engine, and guarantee it to prove itself superior to all others. If, after a fair trial, it does not, we will take it off at our own expense.

Shive Governor Co.
BETHLEHEM, PA.

SHIVE'S PATENT WATCHMAN'S
CLOCK AND DETECTOR,
AND
Buoy's Patent Counter Scale,
No Nest of Weights.

Circulars sent free

THE JUDSON GOVERNOR.

It is a common method to advertise Governors without cost, unless satisfactory to the customer, and then charge High Prices for doing what any good Governor will do. Various Governors inferior to the "Judson" are sold in this way, operating well enough for three months, to insure collection of the pay, but becoming useless after a year's wear—their construction lacks durability. The Judson Governor is guaranteed to be not only the best Regulator of steam Engines, but also the most durable Governor made. Parties in buying other Governors should stipulate that their durability be guaranteed, and should also take care that they do not, for much inferior Governors, pay higher prices than those shown in the accompanying list. We guarantee the Judson Governor will do all any other Governor can do, and in Accuracy and Durability—the main essentials—we guarantee it shall do more.

Reduced Price List, JANUARY 25th, 1876.

For dimensions of Governor, see Illustrated Price List.



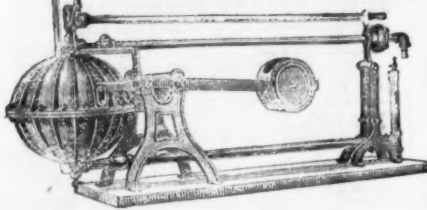
THE JUDSON PATENT
Improved Steam Governor.

Size, Inch.	Plain.	Bright Finish.	Extra Lever.	Stop Valve.
1/4	\$17.00	\$19.00	\$1.90	..
1/2	19.00	21.00	1.90	..
3/4	21.00	24.00	2.00	\$5.00
1	25.00	28.00	2.25	6.00
1 1/4	29.00	33.00	2.50	8.00
1 1/2	35.00	40.00	2.75	10.00
2	42.00	48.00	3.25	14.00
2 1/4	45.00	51.00	3.50	15.00
2 1/2	49.00	56.00	3.75	17.00
3	55.00	63.00	4.25	20.00
3 1/2	64.00	72.00	4.50	25.00
4	74.00	84.00	5.00	30.00
4 1/2	86.00	97.00	5.50	36.00
5	94.00	106.00	6.00	42.00
5 1/2	112.00	125.00	6.50	48.00
6	125.00	138.00	7.00	54.00
7	150.00	165.00	8.00	68.00
8	180.00	202.00	9.00	80.00
9	205.00	225.00	10.00	..

No Charge for Boxing & Cartage.

JUNIUS JUDSON & SON, Rochester, N. Y.

The Albany Steam Trap.



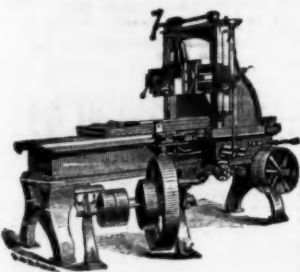
This Trap automatically drains the water of condensation from Heating Coils, and returns the same to the Boiler whether the Coils are above or below the water level in Boiler, thus doing away with pumps and other mechanical devices for such purposes. Apply to

Albany Steam Trap Company,
Albany, N. Y.

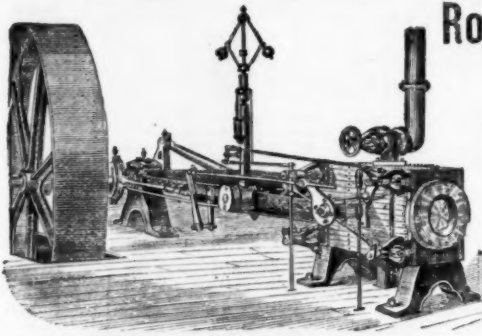
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Have constantly on hand and making

Drop Hammers



Of recently Improved Construction. Pony Trip Hammers, Blacksmiths' Sheaves, Broaching and Stamping Presses, Iron Shop Cranes, Machinists' Tools, Gun and Sewing Machine Machinery. Make to order Gray and Charcoal Iron Castings of all styles and sizes not exceeding 15 tons weight, (making patterns if desired). Furnish Clamp Pulleys of light patterns, cut gears in a superior manner, &c., &c.



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BUILDERS.
Shafting & Gearing.
Boiler Makers.

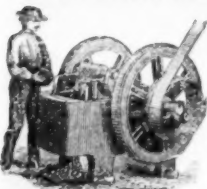
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PORTABLE DRILLS. Driven by power in any direction.
RADIAL DRILLS. Self-feed—Large Adjustable Box Table.
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MULTIPLE DRILLS. 2 to 30 Spindles.
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HAND DRILLS. CAR BOX DRILLS.
SPECIAL DRILLS. For Special Work.

BLAKE'S PATENT STONE & ORE BREAKER.

New Pattern with Important Improvements & Abundant Strength



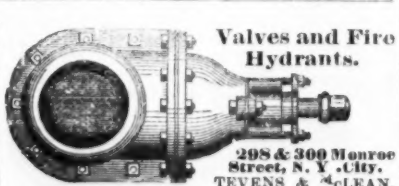
For reducing to fragments all kinds of hard and brittle substances, such as STONE for making the most perfect MACADAM ROADS, and for making the best CONCRETE. It breaks stone at trifling cost for BALLASTING RAILROADS. It is extensively in use in MINING operations, for crushing

IRON, COPPER, ZINC, SILVER, GOLD, and other ORES.
Also for crushing Quartz, Flint, Emery, Corundum, Feldspar, Coal, Barites, Manganese, Phosphate Rock, Plaster, Soapstone, &c.
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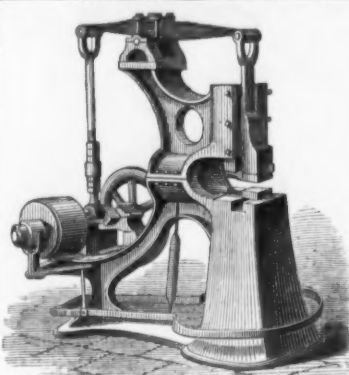
BLAKE CRUSHER CO., New Haven, Conn.



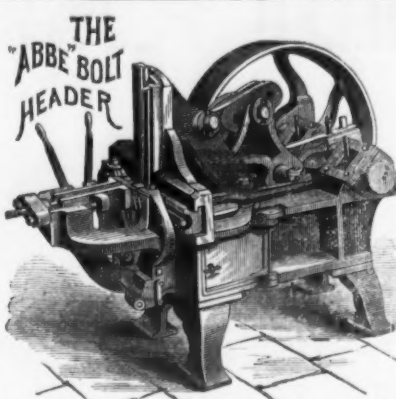
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298 & 300 Monroe St.,
New York,
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Hydrants.
298 & 300 Monroe
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STEVENS & McLEAN.



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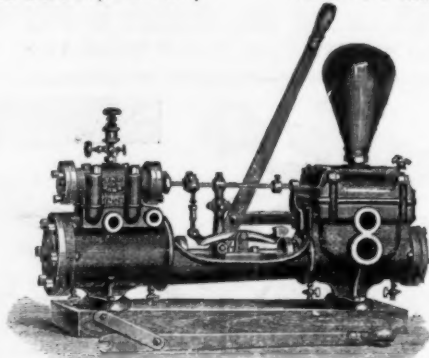
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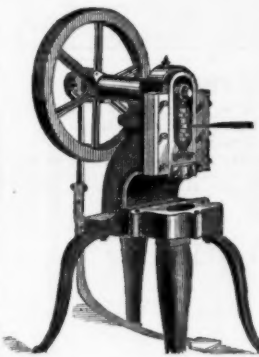
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Mining Pumps (both Double Acting Plunger, and Piston Pattern), which we guarantee to run absolutely noiseless on any lift from 100 to 600 ft., at a single lift, a specialty. Pumps for every possible duty. Prices as low as any, and our workmanship and material altogether the Best. Every machine furnished under a complete guarantee.



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I warrant every part of this Machine to stand the shock of the wheel running at 125 revolutions.

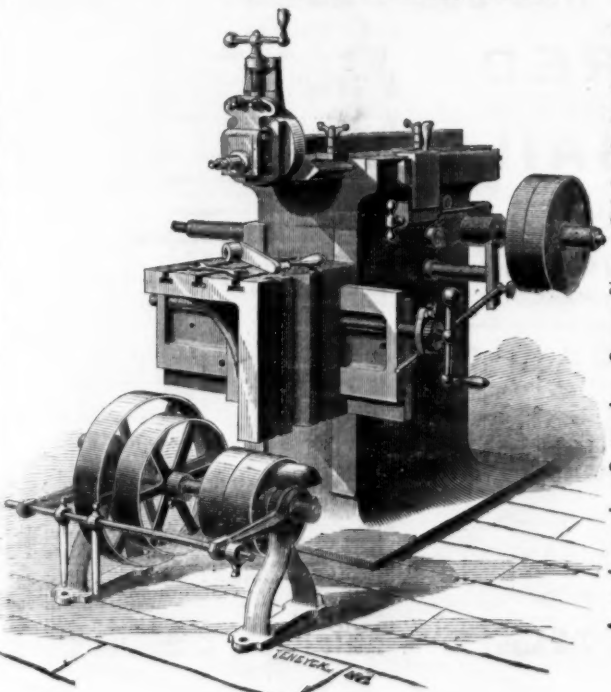
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Machinery Hall, Philadelphia, Section B 4, Columns 28 and 29.

THE HENDEY MACHINE CO.

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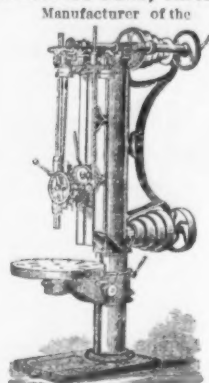
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Patent Planers and Shaping Machines.
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Any length of stroke from 3/4 to 24 inch in length, while machine is running with perfect uniformity of speed of cutting tool. Automatic cross feed of 19 inch and 16 inch, from top of table to bottom of slide when table is down. Send for Circular and Price List.

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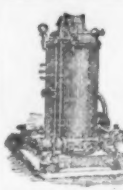
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SAFEST, CHEAPEST & BEST.

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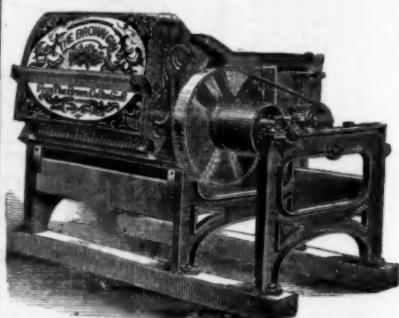
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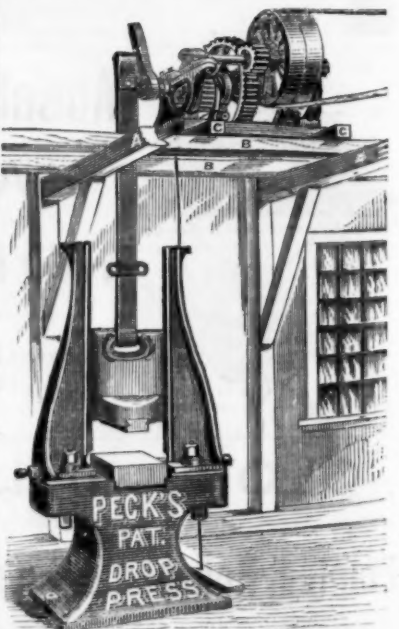
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It requires less power, works faster, gives a harder blow
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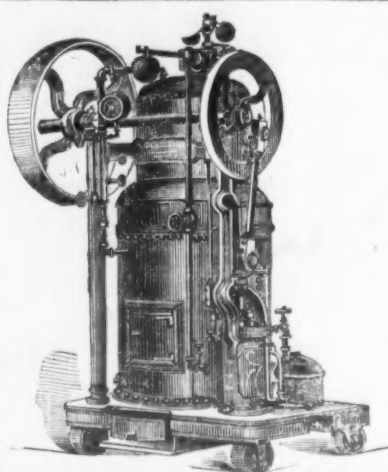
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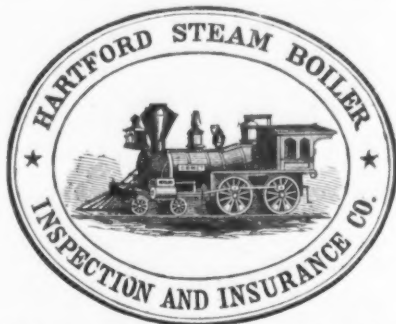
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Engineers, Iron Founders and Machinists.
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The Business of the Company includes all kinds of STEAM BOILERS

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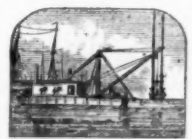
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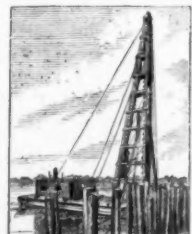
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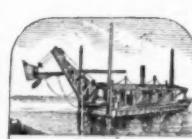
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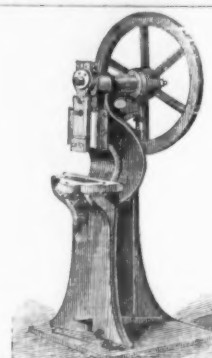
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Punching Presses.THE STILES & PARKER PRESS CO.,
Of Middletown, Conn.The machinery exhibited by these makers is of a
character that calls for special commendation. In
addition to their well known punching presses, to
which a new feature has been added in a press ad-
justable to an inclination for discharging work left
above the die, there are exhibited by them a com-
bined punch and shears, a drawing or blanking press,
and a drop.In all these there is shown the highest mechanical
culture, applied to meet every practical requirement,
to avoid every practical difficulty, and to enlarge the
range of application of the machines, by devices
which are at once simple, elegant, and effective.Your committee would unhesitatingly recommend
for this exhibition the "Medal of Progress," but
find such award debarred by the rule of the Institute,
forbidding such award unless a Silver Medal has
been previously awarded. We, therefore, respect-
fully recommend the award of a Silver Medal.

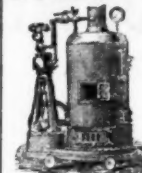
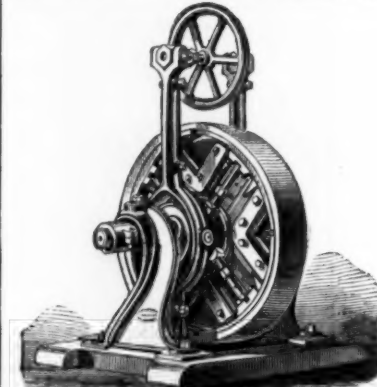
Silver Medal Awarded.

A true copy from the Report on file.

JOHN W. CHAMBERS, Sec'y.

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Steam Pump.Highest Premium awarded by
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